THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

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Stockpiles over reclaiming belt conveyor tunnel, Chattanooga Rock Products Co.

AGRICULTURAL LIMESTONE ISSUE

APRIL 1956

Why Monterey Sand Co.'s CAT D6 Tractor is*
THE CHOICE OF EXPERIENCE

This D6 has a lot to live up to. Its predecessor, another Caterpillar Diesel Tractor, worked 10,000 hours before it needed an overhaul. On the strength of this performance, Monterey Sand Co., of Monterey, Calif., bought the D6.

The new D6 works 16 hours a day, six days a week, stockpiling and loading sand used for sandblasting and filtration. After a little more than 1000 hours on the job, how does it measure up to its rugged predecessor? "We're delighted with the D6 and with the service from our local dealer," says Robert E. McDonald III, a partner in the firm.

The Caterpillar D6 Tractor is built to outlast and outwork any other tractor in its class. On tough jobs in pit or quarry, Caterpillar's exclusive oil clutch cuts costs. It reduces the need for clutch adjustments, prolongs clutch life, and steps up operator efficiency because it provides easier shifting.

The D6's Caterpillar-built four-cycle diesel engine develops 75 drawbar HP—and can do it efficiently and without fouling, thanks to its simple and tinker-free fuel injection system. Other long-life features include hardened track shoes to stand up to hard work around rock, and highly efficient filters and seals that keep lubricants *in* and grit *out* of engine and running parts.

The D6 is available with straight or angling bulldozer blade to fit *your* operation. Your Caterpillar Dealer—who provides prompt, skilled service and parts you can trust—will be glad to demonstrate. Give him a call today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Now they cut through rock with fire

A typical example of B. F. Goodrich improvement in rubber

THE white flame shooting out of the metal pipe is 3800 degrees hot. So hot that it eats through 25 feet of solid granite in *an hour*—something that used to take two men with drills all day long. The spitting fire is made right there in the pipe—a mixture of oxygen and fuel oil fed to the pipe through rubber hose.

The equipment maker wanted a hose that wouldn't go to pieces in a few days from the pressure, oil and heat. His men talked it over with B. F. Goodrich and learned that engineers had developed a hose for just such jobs.

They found a way of reinforcing the hose with strong cords that stand over 5 times the pressure needed to shoot the flame—protecting the man who does the work. They developed a special rubber for the inside that stands oil without rotting or weakening.

The B. F. Goodrich hose that carries the oxygen, fuel oil, and cooling water to the jet pipe had been on the job *8 months* when the picture was taken, is still going strong.

This is an example of the ways B. F. Goodrich engineers find to make rubber save money for users—either by doing a job other rubber can't do, or by lasting longer, or by replacing other more expensive materials. Your B. F. Goodrich distributor would like to tell you what these improvements are, and how they can be employed for your profit. *The B. F. Goodrich Company, Dept. M3619, Akron 18, Ohio.*

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ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY — LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

April 1956

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The following notes are quoted by permission from an actual letter written by one quarry operator to another . . .

My boss thinks you should read this...

YOU CAN'T BEAT THIS COMBINATION

. . . exclusive EASTON electric overhead dumping system and EASTON doorless pan trailer. EASTON trailer capacities range from 10 to 36 tons. For exceptional grades the EASTON pan body may be truck-mounted.

MY BOSS *is a very fair man. He has end dump trucks and side dump trailers and uses both on jobs for which they are suited. But, when another quarry man asked us what we find best for* straight quarry work, *here's what my boss dictated:*

"BOTH TYPES of trucks are required to meet our operational requirements. Were ours a straight quarrying operation, we undoubtedly would favor the side dump trailer units for the following reasons:

"1—Side dump trailer units carry greater pay loads using the same truck as a tractor that is used with the end dump bodies (side dump unit capacity, 35 tons,—end dump unit capacity, 22 tons).

"2—Less spillage experienced hauling 35 tons with side dump units than 22 tons with end dump units (attributed to backs on the side dump trailer units).

"3—Shovel operators claim that loading the side dump units is easier.

"4—Though our roads are maintained for the very best of haulage conditions, racking of loads could be a problem, and in this instance longer unit chassis life should be experienced in the trailer type haulage unit through the better load distribution and the trailer universal action at the tractor hitch.

"5—Dumping at the crusher takes about the same time for both units. The side dump units are dumped by a push-button controlled electric overhead hoist, operated by an attendant at the crusher."

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

A good haulage system must provide efficient dumping. For the most efficient system you can own get the advantages of EASTON's exclusive background of experience and the EASTON automatic electric overhead hoist. B-1071

"Bit cost so low with TIMKEN® multi-use rock bits it's hardly an item"

...says Acme Construction Co.

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OPERATING CONDITIONS: Soft shale to very hard sandstone.

FOR precision drilling in mountain-side formations from soft shale to very hard sandstone, Acme Construction Co. of Beckley, W. Va., used only one size of Timken® multi-use bits. With controlled distribution of reconditioned bits, Acme got a bit cost so low they barely consider it an item.

Driller after driller gets similar savings. With correct and controlled reconditioning, Timken multi-use bits give the lowest cost per foot of hole when full increments of steel can be used in ordinary ground.

But they may not be the best answer for *all* your drilling problems.

When you drill in hard, abrasive ground, you get higher speeds and greater economy by switching to Timken carbide insert bits. They're your best bit for extremely deep holes, constant-gauge holes, small diameter blast holes.

Timken multi-use and carbide insert bits are important time-savers when your drillers change bits. They're interchangeable in the same thread series. And dozens of different Timken bits fit the same drill steel. Bits can be changed right on the job.

All Timken bits are made from Timken fine alloy steel and have special shoulder unions to protect the threads from drilling impacts. We're the only removable rock bit manufacturer that makes its own steel. We do it to control quality at every step of the way. To find out which bit will save the most and do the best job for you, call on Timken Rock Bit Engineering Service. Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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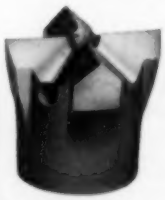
your best bet for the best bit... for <u>every</u> job



Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

Another NORTHWEST goes to work!

MODEL 41

A REAL 1 yd. MACHINE Built from the ground up as a 1 yd. MACHINE

MAKES 25 NORTHWESTS for Dolese Company Oklahoma City Okla.

Dolese Company of Oklahoma City, have used Northwests for years. Their 25th Northwest is a Model 41.

Here is a real 1 yard machine—built from the ground up as a 1 yd. machine able to deliver what you expect from a 1 yd. machine.

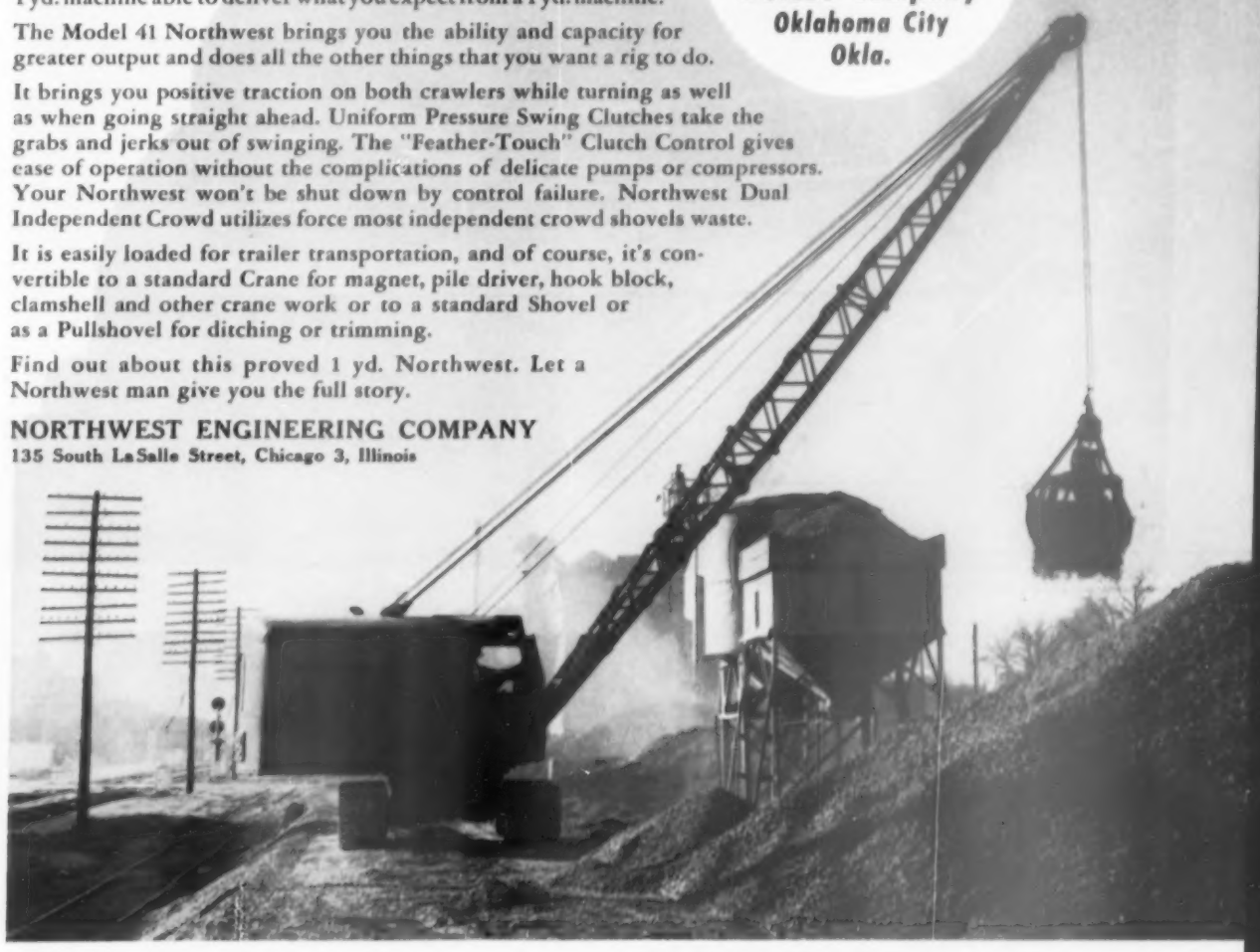
The Model 41 Northwest brings you the ability and capacity for greater output and does all the other things that you want a rig to do.

It brings you positive traction on both crawlers while turning as well as when going straight ahead. Uniform Pressure Swing Clutches take the grabs and jerks out of swinging. The "Feather-Touch" Clutch Control gives ease of operation without the complications of delicate pumps or compressors. Your Northwest won't be shut down by control failure. Northwest Dual Independent Crowd utilizes force most independent crowd shovels waste.

It is easily loaded for trailer transportation, and of course, it's convertible to a standard Crane for magnet, pile driver, hook block, clamshell and other crane work or to a standard Shovel or as a Pullshovel for ditching or trimming.

Find out about this proved 1 yd. Northwest. Let a Northwest man give you the full story.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street, Chicago 3, Illinois



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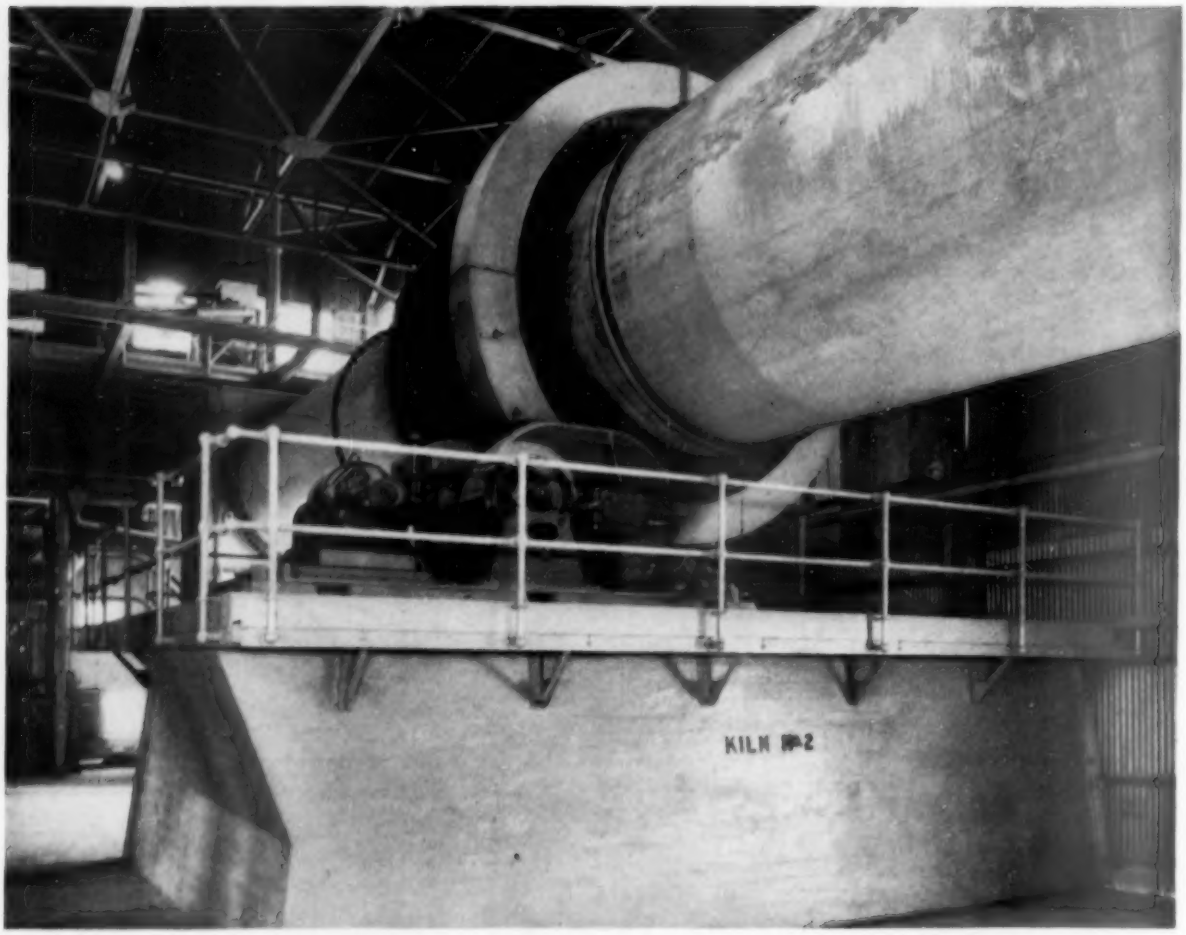
Convertible for any Mining Material Handling or Excavation Problem

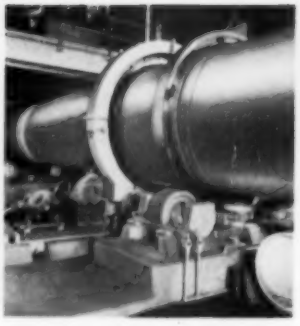
BUILD BETTER ROADS TODAY · FOR A GREATER AMERICA ·

See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957

You Pay Nothing Extra For



TRAYLOR ROTARY KILNS, long the standard of quality in the industry, feature the superior strength of all-welded steel shells plus the convenience of readily adjustable supports. These Traylor features assure perfect alignment to cut maintenance costs and reduce power requirements. Kilns are "Traylor-made" for each individual installation. Sizes have been built to 12′ in diameter and to 450′ long.



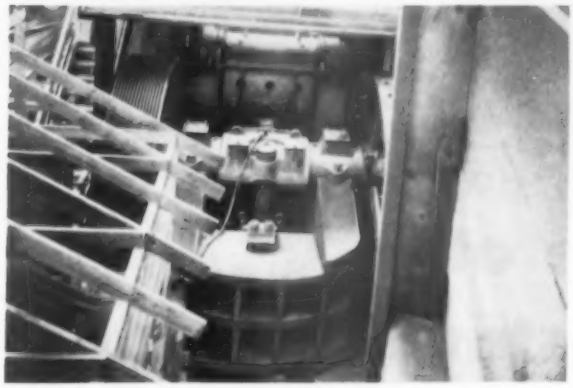
Traylor also builds three types of Rotary Coolers, to individual specifications; Conventional, Diaphragm and Multiple Tube. Special Coolers are also available.

Traylor Grinding Mills include Rod, Compartment, Ball and Tube Mills. Sizes to meet practically every requirement. Special mills are also available.

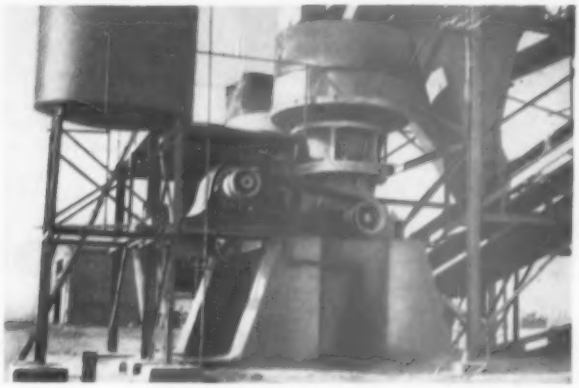
Descriptive literature outlining all the design and operating features of Traylor machinery is available on request. Write, stating your specific interest, and a copy of the appropriate booklet will be sent you.

the Most Important Feature of Traylor Lime Processing Equipment

It's free of extra cost to you . . . Traylor's priceless experience gained during more than a half century of building "Traylor-made" equipment for the world's producers of agricultural limestone and lime products. Exclusive Traylor design features have provided these producers with the highest degree of product control while reducing production costs and maintenance bills to an absolute minimum. Traylor experience is the bonus you get when you use "Traylor-made" equipment on your operation.



TRAYLOR JAW CRUSHERS are "Traylor-made" to provide the massive construction needed for 'round-the-clock heavy-duty primary breaking. Five types and 33 sizes are available with feed openings from 8" x 12" to 60" x 84", featuring Traylor's original curved jaw plates which deliver hourly greater tonnages of finer product with lower maintenance cost and reduced power requirements. Numerous improvements give them great efficiency and high capacity.



TRAYLOR REDUCTION CRUSHERS are outstanding examples of simple, compact design that combine maximum strength with peak operating efficiency. Spring suspension affords protection against tramp iron, bronze bushed eccentric assures long trouble-free service. Traylor's famous non-chokable, self-tightening Bell Head and Curved Concaves produce consistently uniform products with fewer waste fines. Offered in six sizes with feed openings from 1½" to 22".

A Traylor leads to greater profits

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Mack diesel dumper used to haul crushed stone and agricultural limestone from the quarry of the Waukesha Lime & Stone Co., Inc., Waukesha, Wis. In operation since 1905, this quarry is presently producing at a rate of 500,000 tons per year.

Macks make your other equipment investments pay off

For a work-speeding, profit-making combination, team up your big shovels with Mack trucks.

Macks keep shovels on the go because they make fast hauls between mine or quarry and unloading site. They can be depended upon to meet schedules because Macks don't bog down or break down when the going gets tough. They handle the heaviest loads under the toughest conditions. They require minimum maintenance and provide maximum fuel economy.

Whether you utilize trucks for removing overburden . . . for hauling ore from open pit mines . . . or in quarrying operations—putting Macks on the job will pay off because they make possible the most profitable use of machinery and manpower. Investigate Mack trucks today. Contact your nearby Mack representative.

MACK TRUCKS Empire State Building, New York 1, N. Y. 3603

These six mix trucks are just a part of the large fleet operated by the Howat Concrete Co. of Washington, D. C. The fleet is maintained entirely on Gulf products.

GULF QUALITY FUELS and LUBRICANTS

contribute to more hauls, fewer overhauls at Howat Concrete Co.

Like scores of other progressive concrete suppliers, Howat Concrete Co. has found that Gulf quality products help them get more operating hours from equipment with lower maintenance costs.

It will also pay you to take stock of the advantages offered by Gulf petroleum products and service. You get quality lubricants that provide an extra margin of protection for every gear and bearing; fuels that burn evenly and completely, with fewer engine deposits; and expert petroleum engineering counsel.

Try Gulf quality products and dependable service now. Contact your nearest Gulf office today and have a Gulf Sales Engineer recommend the right types and grades for your equipment.

GULF

GULF OIL CORPORATION **GULF REFINING COMPANY**

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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

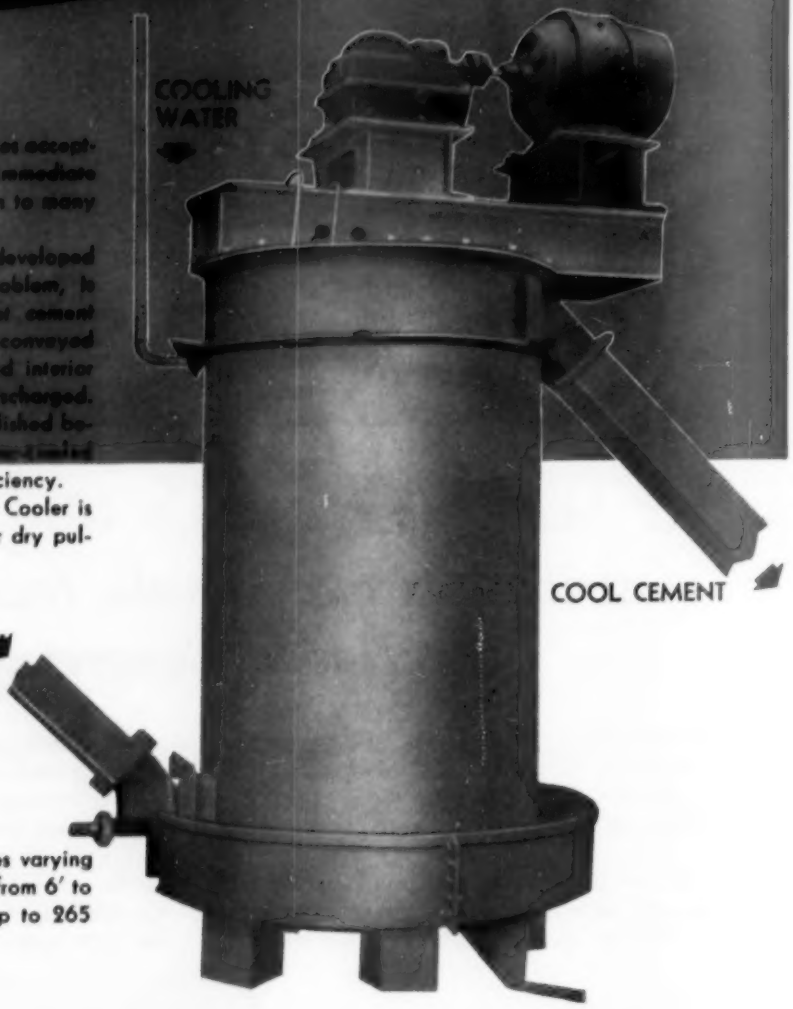
For Cooling Hot Cement

FLS

Cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging is an important problem to many cement manufacturers.

The FLS Cement Cooler, developed especially to overcome this problem, is externally water-cooled, the hot cement being introduced at the base and conveyed in a thin layer along the cooled interior surface to the top, where it is discharged. Thus an intimate contact is established between the cement and the water-cooled surface, assuring high cooling efficiency.

In addition to cement, the FLS Cooler is applicable to many other similar dry pulverized materials.



FLS Coolers are furnished in sizes varying from 3′ to 6′6″ in diameter and from 6′ to 18′ in height, with capacities up to 265 barrels of cement per hour.

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Bombay, India

What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

April, 1956

Jet transport taxi strips may have to be reinforced, according to a report in **Engineering News-Record,** and runways may have to be built up at each end to withstand the impact of planes touching down, and to take the heavier weights when the jets are stopped or moving slowly. Concrete "hot spots" will have to be built on runways now constructed of asphalt. These would be placed at the end of the runway where a jet is given full power at the moment of beginning take-off. The high temperatures produced during the moments before the plane begins to move are too much for asphalt to take without deteriorating.

Uranium-bearing sandstone has been discovered in northwestern South Dakota, as a result of an investigation sponsored by the Atomic Energy Commission as a part of a program conducted by the Geological Survey in search for and appraisal of uranium-bearing carbonaceous rocks in the Rocky Mountain region. A report, entitled "Carnotite-bearing Sandstone in Cedar Canyon, Slim Buttes, Harding County, South Dakota," by James R. Gill and George W. Moore, has been published as a Geological Survey Bulletin 1009-I, and is available at a cost of 35¢ from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Victims of coronary heart attacks are being treated by having their hearts painted with carbolic acid and then smeared with talcum powder. It is claimed that this treatment permits more blood to enter the heart muscle walls; the talcum powder being used to generate an inflammation which sends blood vessels growing into the heart from the sac holding the heart. Pretreatment with carbolic acid is said to protect the patient against severe shock. Research has been carried on at Jewish Hospital, Brooklyn, N. Y.

Construction contract awards for single family homes, in the 37 states east of the Rockies, have almost doubled in the past four years, according to an **F. W. Dodge** report. The 1955 report lists a total of $8.9 billion in contract awards for one-family houses, an increase of 21 percent over the previous record set in 1954. Virtually all of the residential increase between 1954 and 1955 was in the one-family category, with contracts for multiple dwellings remaining practically stationary at the 1954 levels.

Shortages of steel are expected to delay Ohio's road-building program in 1956, according to Samuel O. Linzell, state highway director. He said the steel shortage has made it necessary to allow contractors from three to six additional months to finish "virtually every project involving major structures."

Finely-crushed slag mixed with salt is being spread on slippery spots of Richland Township, Ohio, roads. The material is said to stay on the road better than cinders, and is proving effective on the icy highways.

A group of American home builders are planning a trip behind the Iron Curtain in June, to inspect new Soviet uses for concrete. Earl Smith, past president of the National Association of Home Builders, will lead the dozen or so builders, who will spend about a month in Russia. "We're going over there with open minds," Mr. Smith said, "But we're particularly interested in the advances the Russians have made in the use of concrete, especially in residential construction." The association also sponsored a recent tour of the United States by 10 Russian housing experts.

The Denver Research Institute, University of Denver, is building and will operate a 24-ton-per-day pilot plant for the Oil Shale Corp., to process Colorado oil shale. The plant will utilize the Swedish Aspeco process, the North American rights of which have been licensed to the corporation. Advantages of the process are said to be a high throughput rate and an off-gas of B.t.u. value high enough to be suitable for pipeline transmission.

Steel production in the United States has increased more than 2.5 million tons in the past year, to a record 128.4 million tons annually, according to a report in **Steel Facts.** With scheduled additional expansion and improvement programs, the nation's steel capacity is expected to increase another 15,000,000 tons annually by 1959, according to Benjamin F. Fairless, president, American Iron and Steel Institute.

An investigation of the impact strength of limestone at temperatures up to 900 deg. F., as reported in **Mining Engineering,** has shown that the impact strength of minerals at this temperature is about half the value at room temperature. A New England producer has been taking advantage of this phenomenon by heating quartz to a red heat in a rotary furnace and discharging it to a hammermill.

Experiments in "inflation proof" finance have been reported in the new state of Israel as well as in European countries. An issue of debentures by a portland cement company promises to pay 6 percent interest, and additionally, the interest rate and final capital repayment grow in proportion to the rising price of cement. Another debenture issue promises the holder that he can collect in actual bags of cement.

American Gilsonite Co., an affiliate of Standard Oil Co. of California, is building a refinery at Grand Junction Colo., to produce gasoline and metallurgical coke from gilsonite, a solid hydrocarbon mineral, which the company mines near Bonanza, Utah. Total cost of the project is expected to be over $10,000,000.

Crushed stone will replace present roadbed ballast on 181 miles of Union Pacific Railroad track. According to the railroad, re-ballasting costs $10,000 per mile. This is part of a $17 million program announced by the railroad for roadbed and track improvements during 1956.

Heavy construction awards, nationally, totaled $4,143,551,000 for the first 10 weeks of 1956, which was 33 percent above the corresponding period last year, and 17 percent above the previous high in 1953, as reported in **Engineering News-Record.**

THE EDITORS

New OCC Heavy-Media Vessel

THE 'LAST WORD' IN

SIMPLICITY

A Wholly New Approach to HMS

From top to bottom, the OCC Vessel is specifically designed to take advantage of the simplicity of the HMS process. The result is optimum metallurgical performance and trouble-free operation.

The previously common practice of adapting conventional types of equipment to Heavy-Media vessels necessarily resulted in cumbersome and complicated units. The outstanding advantage of the HMS process is its simplicity. Here are illustrations of how the revolutionary design of the OCC vessel capitalizes on this simplicity. A single rake performs both of the two basic HM separatory functions: maintenance of constant gravity in the medium; removal of sink. This rake is the only moving part in the vessel. There are no rotating parts in the medium; and no gears in its drive. The only friction is that between the rubber-tipped rake and the vessel bottom. For details . . .

Send for Information on Complete Pilot Plant Demonstration and Testing Services . . . Technical Bulletin

The ORE & CHEMICAL CORP.

Division: Mining & Milling Machinery

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This rope can take it!

MONARCH WHYTE STRAND WIRE ROPE BY MACWHYTE

Wherever you put wire rope to work, you need rope designed and made to earn its way on your toughest requirements, under severest service conditions.

To provide you with exactly the *right* rope for each requirement, MONARCH WHYTE STRAND is made in every wire rope classification, PREformed and Internally Lubricated, Lang Lay or Regular Lay, with Fiber Core or Independent Wire Rope Core.

Put MONARCH WHYTE STRAND to the test on your equipment, you will be more than pleased with its performance.

There is a size and construction to meet each requirement of quarry equipment and operation.

Prices, literature, and catalog available through any Macwhyte distributor; or write direct.

MACWHYTE WIRE ROPE

Macwhyte Company, 2949 Fourteenth Avenue, Kenosha, Wisconsin

Ask for MONARCH WHYTE STRAND Bulletin 5425

Manufacturers of: Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies.

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EDITOR'S PAGE

A Real Opportunity for Congress to Aid Small Business

THE PROBLEMS OF SMALL BUSINESS are under intensive study in Washington, with emphasis by the administration and congressmen on plans and programs to stimulate the welfare of small companies. The matter of small versus big business could even become a major campaign issue this year.

Among proposals are methods to combat mergers, lessen the tax burden, facilitate borrowing and enable small companies to compete more readily for government contracts.

That is as it should be but if Congress really wants to help small business, it might turn its attention to a serious problem of such companies in the field of labor relations. If Congress would insure that group bargaining by small employers in their union negotiations is legal, it will have performed a badly needed benefit to such companies and one of great importance to our economy. It wouldn't cost taxpayers a cent either to do so.

Need for Group Bargaining

The need for clarification of the legality of bargaining procedures is urgent, in view of the growing might of national labor unions based on their strength in numbers and in their enormous financial reserves. Small producers of materials like ready-mixed concrete and sand and gravel, operating in local areas, are at a serious disadvantage in labor negotiations with powerful unions.

Growth of these unions has been encouraged over the years by federal laws to the point where vital decisions adversely affecting small industries often do not come from local union officials but, rather, the locals are forced by orders from union headquarters into making extreme demands directed against local industry. Oftentimes these demands and tactics used are unsavory to local union officials. The ordinary working man certainly has little voice in the election of top union officials or in the establishment of basic policies.

Small industries' problem is to try to negotiate with unions of great resources and which hold the balance of power. The least they should be permitted is the legal right to bargain as a group in order to stand a chance.

This unbalance of power is widening and the pressures on small businesses are becoming intolerable, for all manner of demands which take away the rights of management and reflect the arrogance of power tactics. The working man himself is now often at the mercy of union leaders.

Small businesses in these industries have more and more turned to rely on group or area bargaining in order to meet the power of national labor unions. That practice has become well established in recent years and affords a defense that could never be thrown up by one single small company in opposing excessive demands.

Producers of aggregates and ready-mixed concrete are now faced with a serious threat in union labor negotiations, if a recent decision of the U. S. Court of Appeals, Second Circuit (New York), is allowed to stand.

An Adverse Decision

This decision, in the case of the Buffalo Linen Supply Co., on appeal of the Truck Drivers Local Union, reversed a ruling by the National Labor Relations Board. The ruling was on the legality of lock-outs by a group of employers operating under a common contract with the union, when one of the employers is struck so that the union might seek out a weak link in order to overcome group resistance. A strike against one employer was followed by a lock-out of employes by the rest of the group until the controversy would be settled.

N.L.R.B. had decided in a 1954 ruling that the employers were within their rights in protecting themselves as they did, and it was on the basis of that ruling that ready-mixed concrete producers have since met similar union tactics by group action in other areas.

Three other U. S. Courts of Appeals had sustained N.L.R.B. so questions of legality will no doubt be up to the U. S. Supreme Court. Should such ruling be adverse, the cause of small business will have been dealt a serious blow.

The ruling setting aside the N.L.R.B. finding was two to one. It was construed by the dissenting justice that N.L.R.B. was correct, that the lock-out was purely defensive against a threatened strike, and that it was the intent of Congress that the board continue the long-established practice of certifying multi-unit bargaining.

If there be no specific prohibition of group bargaining in the federal statutes, as the dissenting justice brought out in his opinion, now is a good time to legalize the practice and take small industry off the hook. Otherwise a final adverse court ruling may result in small business being forced into accepting demands harmful to the country as a whole. Hot cargo demands and demands for multi-state contracts, among others, now are being pushed hard by the unions.

Congressmen should be made aware of this most serious threat to small business so that group bargaining will be legalized, if they really want to help small business.

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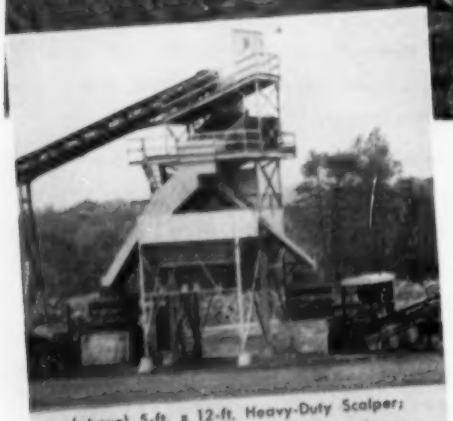

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"Technology of Cement and Concrete"

ROCKY'S NOTES

NATHAN C. ROCKWOOD

AN EXCEPTIONALLY PRACTICAL, and hence useful, book is before us for notice and review. The authors are both past-presidents of the American Concrete Institute, and both have devoted practically all their professional lives in different efforts to know all there is to know about concrete. The book is entitled "The Technology of Cement and Concrete," Vol. 1, "Concrete Materials;"* and the authors are Robert F. Blanks, vice-president and general manager, Great Western Aggregates, Inc., Denver, Colo., formerly materials engineer U. S. Bureau of Reclamation; and Henry L. Kennedy, manager, Construction Specialties Division, Dewey and Almy Chemical Co., Cambridge, Mass., who had much to do with developing air-entraining agents for use in cement and concrete.

Both authors are members of the committees on Cement and on Concrete and Concrete Aggregates of the American Society for Testing Materials, and have had every opportunity to become familiar with developments in both research and practice in the past many years; and both have made important contributions to such developments. The authors in their introduction say that the book is an outgrowth of a course for advanced students at Harvard University Graduate School of Engineering; nevertheless every attempt has been made to use plain, rather than highly technical language. The authors conclude their Introduction with this statement: "If this book serves to foster a wider and better understanding of concrete and to contribute toward making the long-sought ideal of 'concrete for permanence' eventually come true, then the efforts in its preparation will have been amply repaid."

Nothing could better illustrate the attitude of the authors in approaching their task than that quotation. To be sure concrete is, as they say, a wonderful construction material and portland cement a remarkable "magic powder;" but both have limitations that are clearly brought out in this book.

Considerably more than half the text of this volume is devoted to cement, and this includes much practical information on manufacturing processes. Particularly interesting are descriptions not only of how and what processing is done, but why it is done in certain ways. Some of these generalities are quite likely to stir up debate, since experts are not always agreed on such details.

Quality of Cement

For example, it is apparent that the authors believe that most of the virtue of portland cement is in the tricalcium silicate content. However, it is admitted that "a certain minimum content of dicalcium silicate is desirable"—probably this ingredient "should never be permitted to drop below 10 percent." The authors do admit: "There is a modern school of thought which holds that, because of the desire for high-speed construction practices, strength, particularly early strength, has been overemphasized and insufficient stress has been placed on the durability properties of concrete." As a whole, the discussion, it would seem, leaves the reader more puzzled than ever as to what virtues to look for in cement, and how they may be obtained in practical manufacturing operations. However, that merely reflects the present opinion of all the experts.

The Bogue method of calculation of compound composition (calculation of C_3S, C_2S, etc.) is clearly explained. But it is concluded that it is of value chiefly as a means of raw mix control, since the results obtained are not always reliable because of uncontrollable varying kiln conditions, etc. We mention this merely to illustrate that the subject of portland cement manufacture is much more comprehensively covered than would be called for in a course for engineering students; that is, prospective users of cement.

A good deal of space is devoted to false set and early stiffening of concrete mixes, and the evil effects of it. Various suggested causes are listed. The uninitiated might get the impression that concrete is a rather risky construction material, but to most of us it means only that our authors are frank and honest, even with a material they are obviously enthusiastic about. Indeed, throughout the text it is made apparent the authors believe that much more remains to be learned about cement and concrete; and many of the general statements made in one place are later qualified. All this, of course, is to the good and should prove helpful in provoking thought and still more research.

Considerable emphasis is placed on the desirability of good particle size distribution, in the cement, but at the same time it is implied that the best cement is the finely ground portion. Finely ground cement bleeds less, is more completely hydrated, etc. That bleeding, or loss of water by natural drainage, or by artificial suction, injures concrete, in our opinion, has never been proved. To be sure when water rises through a very wet mix to the top, there is "water gain" under pieces of coarse aggregate and the results are not so good. But concrete should be better if such a wet mix "bleeds" downward into a porous subgrade, or into porous forms. Such a distinction should always be made, although possibly this is only a question of terminology.

Manufacturing Processes

The authors appear well informed on manufacturing processes for portland cement, and without being too obvious they make it evident that there is a conflict between the most economic operation and the quality of the finished product. The manufacturer, of course, strives to meet both goals. This conflict is well illustrated in grinding practices, and considerable space of very interesting discussion is devoted to the effects of grinding, both raw materials and clinker, on the quality of the cement.

One paragraph is quoted here to illustrate the character of the text: "Throughout the process of preliminary and secondary grinding of cement, the concrete-making properties of the finished cement must be kept in mind. This is where portland-cement clinker grinding differs from the grinding of cement raw materials. Not only is reduction in maximum size required, but, in order to obtain a product having desirable physical and chemical properties, reduction in size according to an ideal size gradation and compound distribution is necessary. It is for this reason that some cement manufacturers recently saw fit to recondition their old preliminary grinding mills rather than install modern units at about the same cost. One manufacturer of high-early strength cement found that the early strength

(Continued on page 189)

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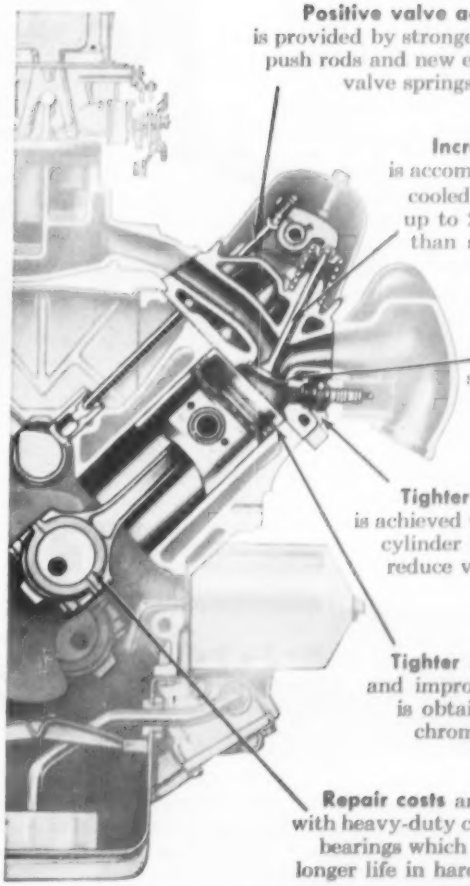

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LABOR RELATIONS TRENDS

NATHAN C. ROCKWOOD

Court Decision Reverses N.L.R.B.'s Ruling on Lockouts

PRODUCERS OF AGGREGATES and ready-mixed concrete will be seriously handicapped in their union labor relations if a recent decision of the U. S. Court of Appeals, Second Circuit (New York) is allowed to stand. This decision, in the Buffalo Linen Supply Co. case, on an appeal by the Truck Drivers' Local Union, reversed a ruling by the National Labor Relations Board on the legality of lockouts by a group of employers operating under a common contract with the union, when one of the employers is subjected to a strike in order that the union might seek out a weak sister to overcome group resistance—what is often referred to as "whip-sawing" employers.

The case grew out of a controversy between a group of Buffalo linen supply companies and the union, and in order to enforce its demands the union struck the operations of one of the group, the Frontier Linen Supply Co. The employers answered the challenge by locking out the union members employed by the rest of the group, until the controversy could be settled and a new group contract accepted. The union charged the employers with an unfair labor practice, but the N.L.R.B., reversing a stand long held by previous members, decided that the employers were entirely justified in protecting themselves as they did. On the strength of this N.L.R.B. ruling in 1954, which we commented on in these pages at the time, ready-mixed concrete producers have met similar labor-union tactics in several of our metropolitan areas.

Three other U. S. Circuit Courts of Appeal have sustained the N.L.R.B. ruling, so that in order to know how they stand before the law, employers will now have to seek a decision by the U. S. Supreme Court. The appeal will probably be made by the N.L.R.B. because its position seemed entirely sound, and provided some foothold for small business in a struggle with unions which are growing constantly in economic strength and ruthlessness. In order that our readers may know the case this court made against such group-action defense, we will quote extracts in what follows, at some length, from the court's decision. It was a 2 to 1 decision, one justice dissenting (and we will also quote from his reasoning).

Court's Statement of Facts

"The union represents all the truck-driver employes of the members of the Linen and Credit Exchange (hereinafter called the exchange), an employer association representing eight employers in collective bargaining negotiations with the union. However, it does not appear from the stipulated facts that the union has been certified by the N.L.R.B. as bargaining agent for the association-wide unit. The terms of the agreements were worked out by the representatives of exchange and the union, and then submitted to the membership of exchange and the union for majority approval. When majority approval was given, the agreement was signed by each member of exchange and by the union. This had been the practice for the 13 years preceding this controversy.

"Sixty days before April 30, 1953, when the contract (which contained an automatic renewal clause requiring notice of a desire to change the contract to be given sixty days before the expiration date) was to expire, the union notified exchange of its desire to open negotiations to change the agreement. In March, 1953, negotiations were begun for a new collective bargaining agreement. Meetings were held during the succeeding weeks but no agreement was reached. On May 26, 1953, the truck-driver employes of Frontier Linen Supply, Inc., a member of exchange, went on strike, but the employes of the other seven members remained on the job.

"On the evening that the strike against Frontier began, exchange notified the union that the other members were laying off all their truck-driver employes until the strike at Frontier was ended. A lockout by these seven members of exchange followed; at the succeeding negotiations, the union was told that the employes of all such members would be recalled to work if the picket line at Fontier were withdrawn and the strike terminated.

"On June 3, 1953, agreement was reached on a new contract which was uniformly applicable to all members of exchange, including Frontier. Both the strike and the lockout were then terminated, and the employes of all the members returned to work. The union thereupon filed a complaint with the N.L.R.B. charging exchange, and the seven members who had locked out their employes, with unfair-labor practices in violation of §8(a)(3) and (1) of the Labor Management Relations Act of 1947. The Board overruled the determination of the trial examiner that these employers had engaged in unfair labor practices by locking out the non-striking employes, and dismissed the complaint. The Board held that the strike against Frontier constituted a threat of a strike against all the other members of exchange and that the non-struck members were justified in locking out their employes until the strike against Frontier ended.

Union Argument

"The union contends that there was no evidence of a threat of a strike against the employers other than Frontier. We think, however, that the Board reasonably inferred such a threat. For previously the union had conducted its negotiations with exchange, but here, during such negotiations, it began a strike against Frontier, one member of the exchange, although there was no peculiar facts concerning the union's relations with that single member.

"We come then to the question at the heart of the case, i.e., whether the threat of a strike legalized the lockouts by those employers against whom no strike had been called.

"No provision of the L.M.R.A. of 1947, by its terms, generally specifically prohibits or authorizes lockouts by employers; and the Board, in its opinion, states that it does not hold that the employer's right to lock out its employes is the corollary of the employes' statutory right to strike. In addition, §7 of the Act guarantees employes the right to engage in 'concerted activities' for 'their mutual aid or protection;' and it has been held that the right to strike and to support a strike constitutes 'concerted activity' which is protected by the statute. Interference with this right by the employer constitutes an unfair labor practice under §8(a)(1) of the Act, and a lockout prompted by a purpose to defeat employe organization or otherwise protected concerted activities is violative of the Act. Such a lockout would also violate §8(a)(3) of the Act.

(Continued on page 192)

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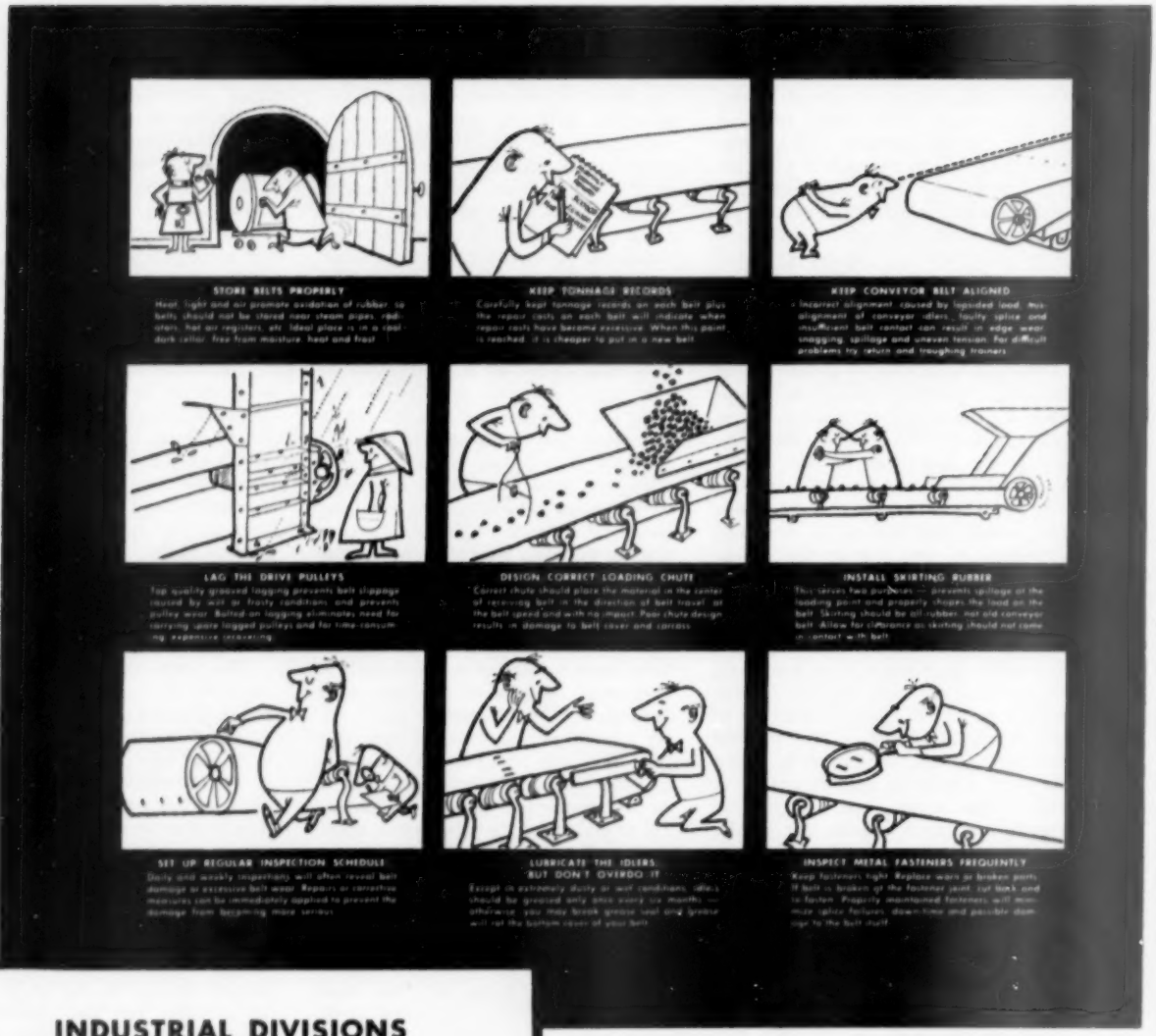
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SET UP REGULAR INSPECTION SCHEDULE
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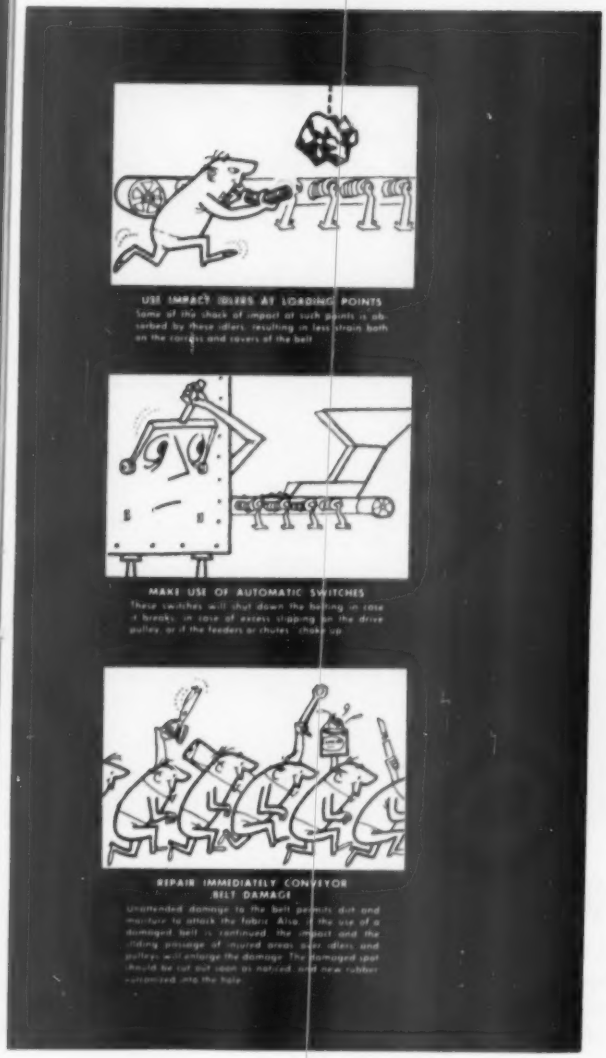
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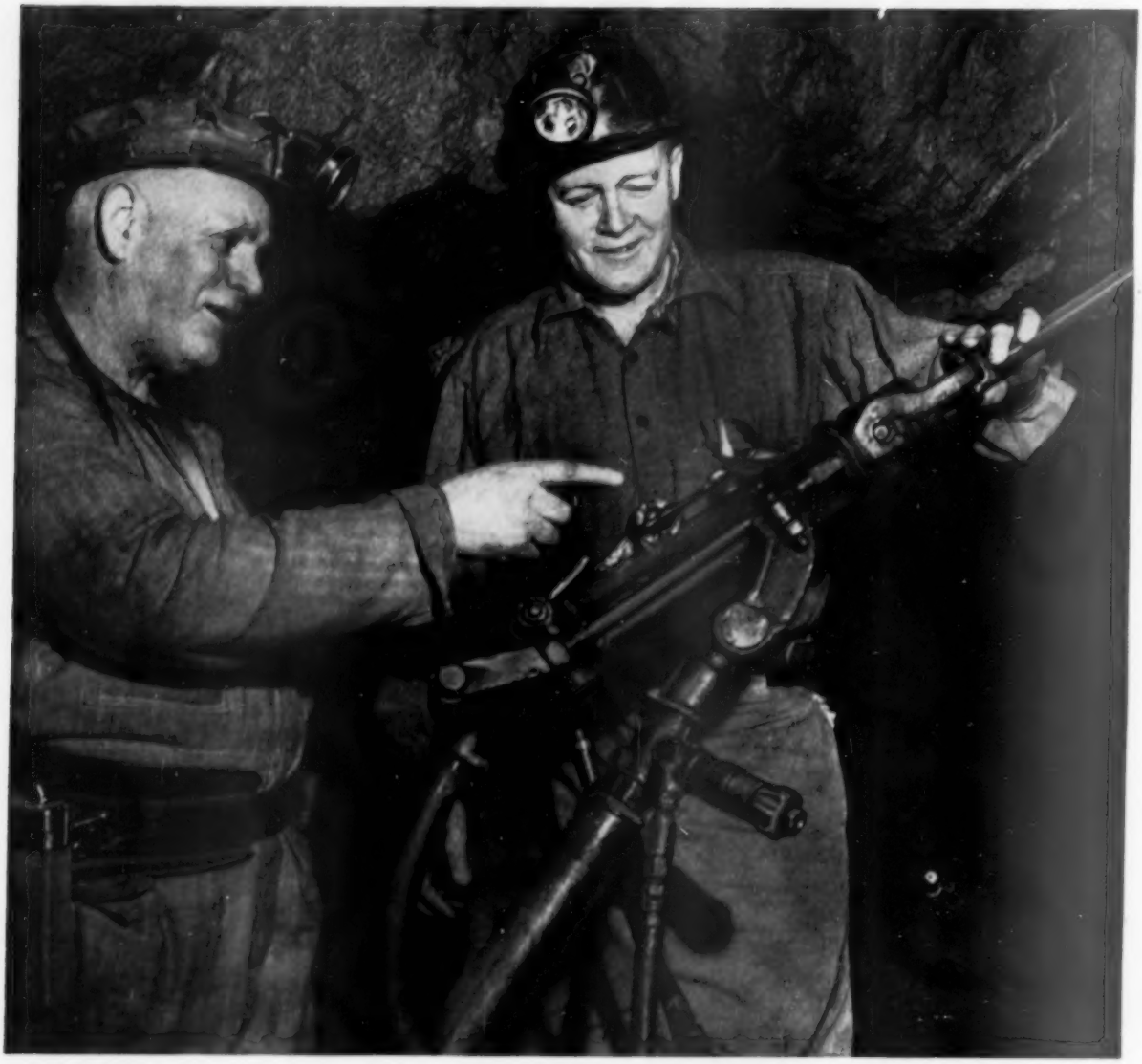


That's right mister! YOU'RE POINTING TO GREATER EFFICIENCY

When you point to that CP Airleg combination, Mister, why not point out that they team up to give the maximum drilling efficiency obtained when using Tungsten-Carbide bits. And that the leg takes constant recoil shock yet holds the drill firmly to the work. And while you're at it, point to the exclusive pressure release type control handle and balanced feed leg that assure steady bit pressure even under variable line pressure and different rock formations – eliminate "slapping" and reduce bit breakage. Then point to the emergency push button that releases feed-leg pressure instantly. Point out that it's available with a feed cylinder of either steel or aluminum alloy and with 36″ and 48″ feed travel. And that it makes a perfect combination . . . the Chicago Pneumatic Airleg and Sinker Drill! And if your friend has any more questions, Mister, ask him to write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic

PEOPLE

IN THE NEWS

Ideal Promotions

CRIS DOBBINS, president, Ideal Cement Co., Denver, Colo., has announced the following promotions: Oakley F. Counts, comptroller, has been elected vice president and comptroller, and Thomas B. Douglas has been named vice-president for operations. C. B. Flick, treasurer, has also been elected secretary and a director to fill the vacancy caused by the recent death of Wilson McCarthy. Harry B. Bolton, formerly southern region sales manager at Mobile, Ala., has been appointed general sales manager, succeeding Robert W. Winters, who passed away a few hours after his appointment as vice-president for administration. S. A. Gretencourt, who has been with Ideal Cement Co. for 20 years, succeeds Mr. Douglas as general production manager. G. W. Ballantyne continues as an assistant secretary and assistant treasurer. Harold H. Nees has been appointed an assistant secretary and assistant treasurer.

President and Director

LOUIS P. STRUBLE, JR., general manager of the Keystone division of Dravo Corp., Pittsburgh, Penn., has

Louis P. Struble, Jr.

been appointed president and director of the Union Barge Line Corp., a subsidiary of Dravo Corp., to succeed Lowell L. French, who died February 4. F. J. Lloyd, Jr., formerly operations manager, succeeds Mr. Struble as general manager of the Keystone division.

Mr. Struble, a graduate of Lehigh University, Bethlehem, Penn., joined the engineering works division of Dravo in 1935. He was appointed general manager of the Keystone division in 1950, elected a director in 1951 and a vice-president in 1953. He is also vice-president and director of Charleroi Supply Co., Charleroi, Penn., and a director of Dravo-Doyle Co., Pittsburgh.

Mr. Lloyd had been operations manager of the Keystone division since

F. J. Lloyd, Jr.

1945. He joined the company following graduation in 1923 from Lehigh University with a civil engineering degree.

Highway Board Chairman

KENNETH B. WOODS, head of the School of Civil Engineering, Purdue University, Lafayette, Ind., has been elected chairman of the executive committee of the Highway Research Board, National Research Council, Washington, D. C. He succeeds G. Donald Kennedy, president of the Portland Cement Association, Chicago, Ill. Prof. Woods is also director of the Joint Highway Research Project at Purdue University.

Heads Engineering Department

WILLIAM C. GREEN has been named chief of the engineering department of Texcrete Structural Products Co., an affiliate of Texas Industries, Inc., Dallas, Texas, and producers of Haydite

William C. Green

precast concrete structural products. A graduate of Rensselaer Polytechnic Institute, Troy, N. Y., Mr. Green formerly served with the Industrial Bureau of Standards handling research on structural properties of lightweight concrete aggregates.

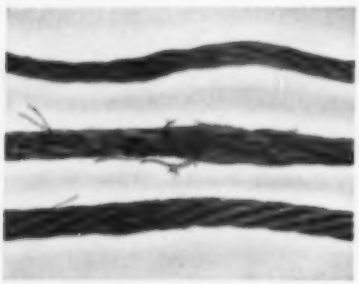
N.C.M.A. President

EARL W. PETERSON, vice-president, Ideal Cement Stone Co., Omaha, Neb., was elected president of the National Concrete Masonry Association at its annual meeting held recently in New Orleans. He succeeds S. Carl Smithwick, president, Smithwick Concrete Products, Portland, Ore., who becomes an ex-officio member of the board of directors. Philip Paolella, Plasticrete Corp., Hamden, Conn., Herbert J. Vincent, Cinder Block, Inc., Detroit, Mich., and A. R. Waters, Carter-Waters Corp., Kansas City, Mo., were elected vice-presidents. Carroll Strohm, Jr., Nashville Breeko Block and Tile Co., Nashville, Tenn., was re-elected secretary-treasurer.

Mr. Peterson has been in the concrete masonry industry for 30 years. He joined Ideal Cement Stone Co. in 1925 as a dispatcher. He was elected to the board of directors in 1927 to fill a vacancy created by the death of his father, N. J. Peterson, who with a brother, Charles Peterson, founded the company in 1906. He continued as a dispatcher and salesman until 1945, when he became plant manager upon the retirement of Charles Peterson.

Tuffy® Tips

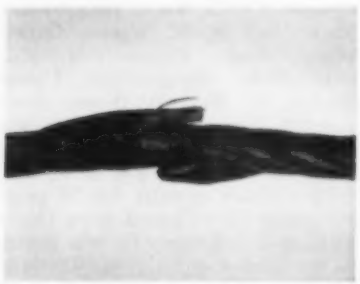
This Is Often Where The Trouble Starts...



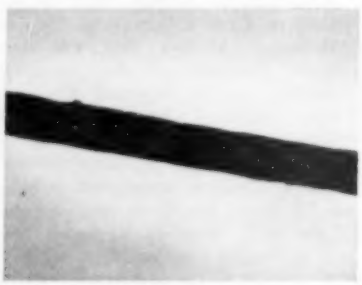
Here are three types of open kinks, all resulting from mishandling of wire rope. Guard against kinks by winding rope properly on the drum, and *never* pull a loop smaller, always enlarge it then straighten out the rope.

The start and finish of doglegs; the end being the point when all the wires on one side of the rope were worn through. Anything, such as a pulled loop, that causes a permanent bend or "set" will result in a dogleg.

While different wire rope is constructed to resist abrasion to different degrees, improper use leads to injury. Watch for abrasion and when it begins to show locate the point where it is occurring and correct the cause.



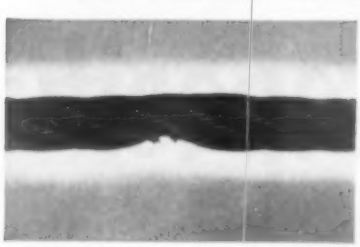
Severe corrosive water conditions caused rust and corrosion to produce a one-strand break in this rope. Lubrication during the time the rope was in service would have retarded the damage . . . added greatly to the rope's life.



If broken in improperly, high strands like these may result. When installing, make sure that the fabricated relation between *strand with strand* and *strands with core* are not changed.

Nailing a wire rope through the core often causes many undesirable results. The wires and the core are badly damaged. A high strand may develop near the end or many feet away.

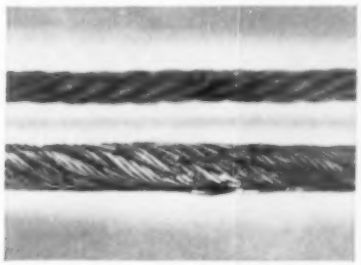
Broken Rules Break More WIRE ROPE Than Capacity Loads



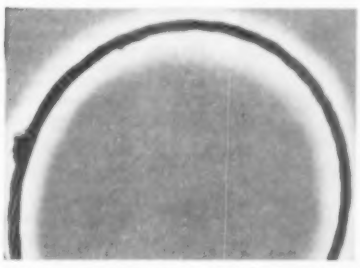
The photo at the left shows what happens when rope is run over or struck by a hard object and crushed. The damage to the strands greatly reduces the service life so carefully built into the rope.

Photo at the right shows how sudden release and rebound from an over-stressed condition may often cause birdcaging. Throwing a loop into the rope is also a major cause of birdcaging. Lang Lay ropes in particular are vulnerable to this abuse.

Here is an example of excessive pinching in the sheave grooves. This rope lasted through only 1-½ hours of service. To prevent pinching, make sure grooves are not worn deep and that the bearing surface is sufficiently large.



Excessive drum crushing like this occurs at points of cross-over or when rope is wound unevenly. Check for even winding of each layer on the drum to prevent crushing of this type.



When a popped core occurs, continued use causes the rope lay to lengthen out considerably. This displacement of the core is usually caused by load tension being suddenly removed from the rope.

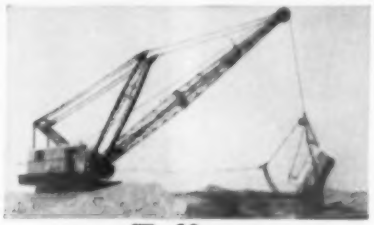
Forget Complicated Specifications— Just say Tuffy®!

Tuffy Scraper Rope

Mount a reel on your scraper and get full service out of every foot. Specially constructed for scraper service where complex destructive forces overwhelm ordinary rope.

Tuffy Slings & Hoist Line

Slings of the famous Tuffy machine braided, kink-resisting, 9-part construction, cut replacement costs. For balanced performance, team them up with Tuffy Hoist Line.



Tuffy Dragline

Flexible enough for easy casting, tough enough to give you maximum abrasive resistance and service life in handling wet or dry, hard or soft materials.

Tuffy Dozer Rope

Has the stamina needed to stay on the job after ordinary ropes are thrown away. In 1/2" or 9/16" size on 150' reels for easy mounting to facilitate cut-off without waste.

Your Tuffy Distributor: Dependable Source of Information.

His job is more than just supplying the wire rope you want—when you want it. Your Tuffy distributor is always on the alert to help make your equipment do the best possible job, at the lowest possible cost. When you have a problem that calls for special knowledge concerning your equipment that uses wire rope, give your Tuffy distributor a call. He'll be glad to furnish the help you need including factory engineers.

union Wire Rope corp.

2156 Manchester Avenue Kansas City, 26, Missouri

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

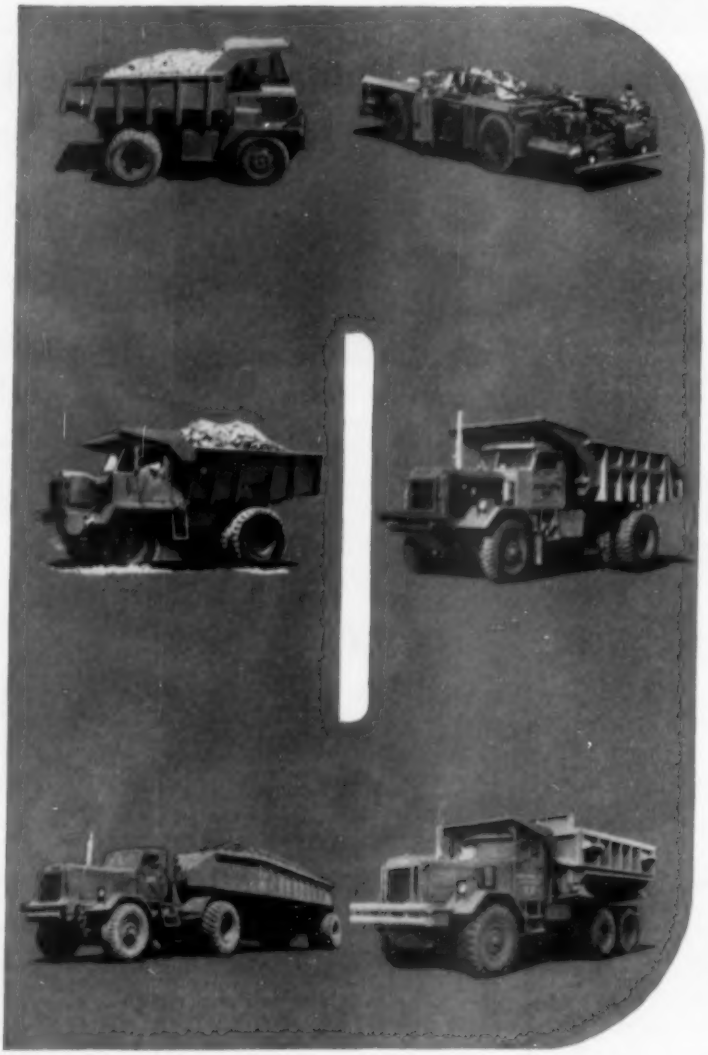
2

DART SINCE 1903 . . . A PIONEER IN

ENGINEERING and BUILDING OFF HIGHWAY TRUCKS

10 Ton to 55 Ton Capacity

MODEL 10-S — 10 ton end dump truck, powered by 150 H.P. Diesel Engine. 13,000# front axle with 17¼" x 3" air brakes. 26,000# full floating double reduction rear axle with 16½" x 7" air brakes. 12.00 x 20, 16 ply rock lug tires all around. Hydraulic steering. Approximate weight with body and hoist, 20,000#.



MODEL 18-S-UG-S—18 ton underground truck powered by 200-300 H.P. Diesel Engine with torque converter and fully reversible transmission. Hydraulic motor operates steel apron conveyor. Equipped with exhaust scrubber. Hydraulic steering. Operates as shuttle car. Height, 60"; width, 11'-0"; length, 28'. Approximate weight, 43,300#.

MODEL 20-S — 20 ton end dump truck powered by 225-275 H.P. Diesel Engine 20,000# front axle with 17¼ x 4" air brakes and 70,000# full floating planetary rear axle with 20 x 9" air brakes. 14.00 x 24, 20 ply rock lug tires front, 18.00 x 25, 24 ply rear. Hydraulic steering. 5 speed transmission or torque converter with 4 speed transmission. Approximate weight with body and hoist, 35,000#.

MODEL 25-SL — 25 ton end dump truck, powered by 300 H.P. Diesel Engine. D-75-S rear axle, 100,000# capacity. FU900 front axle, 25,000# capacity. 20 x 9" air brakes. Torque converters optional. Hydraulic steering. 14.00 x 24 front tires, 18.00 x 25, rear tires. Approximate weight, 48,000# with body and hoist.

MODEL 50-S-BDT — 60 cubic yard bottom dump coal hauler. 300 H.P. Diesel Engine, Allison converter and 3 speed transmission, or optional Twin Disc converter and 4 speed transmission. Trailer axle, 85,000# capacity, 20 x 9" air brakes, hydraulic dump. Approximate weight, 68,000#.

MODEL 35-T — 35 ton side or end dump truck, powered by 300-400 H.P. Diesel Engine, 25,000# front axle with 16.00 x 25 tires all around. 200,000 tandem full floating rear axle. Torque converters optional. Hydraulic steering. Approximate weight, 70,000# with body and hoist.

D-115

DART TONNAGE ENGINEERED TRUCKS

Kansas City 8, Missouri

SUBSIDIARY OF THE CARLISLE CORPORATION

Dependability

He has also served as secretary of the company.

Mr. Peterson is also president of the Nebraska Concrete Masonry Association and in 1955 served as chairman of the Accident Prevention Committee of N.C.M.A.

Officers Re-elected

GORDON TONGUE and James D. Burns have been re-elected president and chairman of the board, respectively of Northwestern Portland Cement Co., Seattle, Wash. Other officers re-elected are: C. T. W. Hollister, chairman of the executive committee; Harold Shefelman and Frank Kiernan, Jr., vice-presidents; D. G. Metcalf, secretary-treasurer; and H. Johnson, assistant secretary treasurer.

Partner in Concrete Firm

GEORGE H. EHLEN, manager of the Portland Concrete Pipe and Products Co., Portland, Ore., has become a partner in the firm, according to an announcement by Floyd L. Martin and Hugh P. Ford. Mr. Ehlen has been with the company for the past 17 years, during which he has served as office manager, production manager and manager. He is also a director of the Oregon Building Congress and the Associated Concrete Products Manufacturers.

Production Manager

RICHARD J. FRAZIER has been appointed production manager of Anchor Concrete Products, Inc., Buffalo, N. Y., according to an announcement by Frederick W. Reinhold, president. Mr. Frazier will also have charge of the company's research, new product development and quality control programs. A graduate of Catholic University of America, Washington, D. C., with a degree in civil engineering, Mr. Frazier was formerly plant manager and research and development engineer for the Washington Brick Co., Washington, D. C.

Chief Chemist

ROBERT C. ANDERSON has been appointed chief chemist and inspector at the Hannibal, Mo., plant of Universal Atlas Cement Co., New York, N. Y., to succeed Hugo E. Koch, who died February 13. Mr. Anderson, formerly assistant chief chemist and inspector at the plant, was born in Duluth, Minn., and received his B.A. degree from the University of Minnesota, Minneapolis, Minn., where he majored in chemistry and mathematics. He joined the Duluth plant as a tester in 1942. After service in the U. S. Army in World War II, he returned to Duluth in 1946, and was promoted to chemist in 1951. A year later, he was appointed assistant to the chief chemist and inspector at Hannibal. In 1953, he was named assistant chief chemist and inspector.

Robert C. Anderson

Warner Promotions

KENNETH E. THOMPSON, formerly assistant to the superintendent of the Berks St. Yard, Warner Co., Philadelphia, Penn., has been appointed superintendent to succeed Charles J. Hemmerle who passed away recently. Genevieve Hoey has been named to succeed Ed Haines as assistant secretary of the company, in addition to her duties as secretary to Charles Warner, Jr.

Re-elected S.C.M.A. President

HERBERT JAHNCKE, vice-president and treasurer of Jahncke Service, Inc., New Oreans, La., has been re-elected president of the Southern Concrete Masonry Association. Thomas Goodbee was named vice president; Fred C. Dent, executive secretary; and Ray Marino, treasurer.

Sales Manager

R. P. MITCHELL, formerly assistant sales manager of the Colorado division of Ideal Cement Co., Denver, Colo., has been promoted to sales manager of the Spokane division to succeed Roy Neill who has been assigned other duties in the sales department.

C. of C. President

DALE WILLIAMSON, co-owner of the City Block and Products Co., Independence, Mo., was recently elected president of the Independence Chamber of Commerce for one year.

Sales Engineer

WILLIAM M. JOYCE has been appointed sales engineer for Buildex, Inc., Ottawa, Kan. He was formerly an engineer in the Kansas City sales office of the Truscon steel division of Republic Steel Corp. Born in Kansas City, Mo., Mr. Joyce studied engineering at Kansas City Junior College and the University of Kansas, Lawrence, Kan.

Receives Jaycee Award

HARRY W. EASTERLY, JR., executive vice-president and general manager of the Concrete Pipe and Products Co., Richmond, Va., was recently presented the 1955 Distinguished Service Award of the Richmond Junior Chamber of Commerce for "outstanding civic service to the community."

Heads Dallas Engineers

E. L. STIEG, structural engineer for Texcrete Structural Products Co., Dallas, Texas, has been named president of the Dallas chapter of the Texas Society of Professional Engineers.

Re-elected President

GEORGE WALLAU was re-elected president of the Jefferson City Sand Co., Inc., Jefferson City, Mo., at a recent meeting of the board of directors. Ralph Moore was named vice-president to succeed the late Albert Wallau, and Mrs. Mary Dulle was appointed secretary-treasurer.

Named Vice-President

ELMER A. PETERSON has been promoted to vice-president of Rocklite Products, Ventura, Calif., according to an announcement by E. F. Brovelli, president of the company. Mr. Peterson has been serving as general manager of operations in Southern California.

Re-elected Board Chairman

M. MOSS ALEXANDER, president, Missouri Portland Cement Co., St. Louis, Mo., has been re-elected chairman of the board of the Federal Reserve Bank of St. Louis and federal reserve agent at the bank, which posts he has held for the past two years.

Candidate for State Senate

ALBERT WILTGEN, owner and proprietor of the Wiltgen Ready Mixed Concrete Co., Le Mars, Iowa, has announced his candidacy for the Democratic nomination for state senator of Iowa.

Association President

ROBERT B. GARMAN, vice-president and general manager, Tyrone Lime and Stone Co., Tyrone, Penn., was re-elected president of the Pennsylvania Stone Producers Association at the annual meeting held recently in Harrisburg. Other officers elected are: John D. Teeter, president and general manager of John S. Teeter & Sons,

Inc., Gettysburg, vice-president; H. M. Binkley, president and general manager of Binkley Bros., Inc., East Petersburg, treasurer; and E. J. Breneman, president and general manager of E. J. Breneman, Inc., Pottstown, secretary. H. H. Wagner was re-elected general manager. Mr. Garman was also re-elected to the board of the Pennsylvania Ready Mixed Concrete Association

Association Officers

CLIFFORD H. SANDUSKY, general manager of The King-Eichenlaub Co., Columbus, Ohio, has been elected president of the Columbus Concrete Block Association. Frederick R. Lang, assistant manager and secretary-treasurer of The Cunard-Lang Concrete Co., Columbus, was elected vice-president. John F. Royer was renamed secretary-treasurer.

Production Superintendent

DANIEL RYAN has been appointed production superintendent for the Bedford Hills Concrete Products Corp., Bedford Hills, N. Y. He succeeds George A. Paro who passed away November 14. Lyle Blaylock has been made buildings and yards superintendent.

Appointed Vice-President

W. ASHLEY GRAY, JR., formerly sales manager, has been made vice-president of the Pioneer Silica Products Co., St. Louis, Mo.

Cement and Quarry Chairman

HOWARD RIEFENSTAHL, safety director of the Alpha Portland Cement Co., Easton, Penn., was recently elected chairman of the cement and quarry section of the National Safety Council, Chicago, Ill.

C. of C. Director

F. A. WEIBEL, president of Allentown Portland Cement Co., Catasauqua, Penn., has been appointed a director of the Pennsylvania State Chamber of Commerce for a two-year term.

Industrial Sales Manager

M. D. HENERY has been appointed manager of industrial sales for the Kelley Island Co., a division of Basic Refractories, Inc., Cleveland, Ohio.

OBITUARIES

RAYMOND L. WALSH, retired assistant vice-president and chief engineer of Universal Atlas Cement Co., New York, N. Y., died February 22 after a brief illness. He was 65 years old and had been associated with the company for more than 30 years. A native of Chicago and a graduate of electrical engineering at Illinois Institute of Technology, Mr. Walsh joined Universal Atlas at Chicago in 1925 as assistant electrical engineer, became electrical engineer in 1929, assistant chief engineer in New York in 1944, and chief engineer in 1953. He had been assistant vice-president and chief engineer since February, 1955. Mr. Walsh was a member of the American Institute of Electrical Engineers, the Association of Iron and Steel Engineers, and had served on the Portland Cement Association sub committee for Electrical Hazards in Quarry Operations, as well as with the Bureau of Accident Prevention and Insurance.

CHARLES E. KUHLMAN, president, Kuhlman Builders Supply and Brick Co., Toledo, Ohio, died February 26 after a short illness. He was 60 years old. Born in Toledo, Ohio, Mr. Kuhlman joined the firm, headed by his father, Adam R. Kuhlman, in 1919. The company was known as the Toledo Builders Supply Co. until 1928. He became president upon the death of his father in 1935. Mr. Kuhlman was one of the organizers of the Ohio Ready Mixed Concrete Association in 1938, and had been an active member since that time. He was president of the association in 1945-1946.

HUGO E. KOCH, chief chemist and inspector at the Hannibal, Mo., plant of Universal Atlas Cement Co., New York, N. Y., died suddenly on February 13. Mr. Koch was born in St. Louis, Mo., and upon graduation from the Missouri School of Mines, Rolla, Mo., in 1916, he joined the Hannibal plant as chemist. After service in the U. S. Army in World War I, he returned to Hannibal as chemist, became foreman in 1923, chief chemist in 1928, and chief chemist and inspector in 1944.

RICHARD S. LAUBACH, SR., retired chief chemist at the Bath, Penn., plant of Penn-Dixie Cement Corp., Nazareth, Penn., died January 24 after a short illness. He was 70 years old. Mr. Laubach started his career in the cement industry in 1905. He was chief chemist at the Nazareth plant for many years before becoming chief chemist at the Bath plant. He retired in 1953.

MEL SMITH, cement plant consultant, died February 5 in Honolulu, Hawaii, where he and his wife were vacationing. A chemical engineer, he would have celebated his 78th birthday on February 15. Mr. Smith, who founded the American Chamber of Commerce in Spain in 1920, built cement plants in the United States, Brazil, Ecuador, Mexico, the Dominican Republic and Canada. He served as director of the American Chamber of Commerce in Spain for four years and as president for two years.

CLARENCE E. HARRIS, chief chemist at the Iola, Kan., plant of Lehigh Portland Cement Co., Allentown, Penn., died January 17. He was 63 years old. Mr. Harris joined the Iola plant as a chemist in 1918 and five years later transferred to the plant at Birmingham, Ala. In 1943 he returned to the Iola plant where he had been chief chemist for the past 13 years.

J. B. NELSON, a chemist for the U. S. Gypsum Co., Port Clinton, Ohio, died February 12 of injuries received when his car collided with a truck near Toledo, Ohio. He was 58 years of age.

GEORGE R. ALEXANDER, superintendent of the Hamilton, Ohio, plant of the North Cincinnati Sand and Gravel Co., Inc., Cincinnati, Ohio, died February 17 at the age of 72.

CLAUDE L. WEYMOUTH, executive assistant at the Stoneway Sand and Gravel Co., Renton, Wash., died January 15 after a brief illness. He was 53 years old.

WILLIAM HERSCHELL COX, JR., president of the Jesse Allen Lime Co., Nashville, Tenn., died February 8 at the age of 75. A graduate of Vanderbilt University, Nashville, Tenn., Mr. Cox had been semi-retired for the past five years.

RONALD L. CLEMENT, retired operator of the Clement Concrete Co., Akron, Ohio, died February 16 in Clearwater, Fla., where he had been spending his winters since 1950. He was 78 years of age.

EDWARD C. FLIERL, who served as secretary-treasurer of the old Carroll Bros. Sand and Gravel Co., Buffalo, N. Y., until his retirement, died February 17. He was 82 years old.

ELBERT W. SPRING, founder of the Spring Gravel Co., Crookston, Minn., died February 1 after an illness of several months. He was 73 years of age.

JAMES H. CARLL, JR., head of the sales department of the Asheville-Schoonmaker Mica Co., Inc., New York, N. Y., died February 11 at the age of 63.

JOSEPH L. KOZLOWSKI, SR., proprietor of the Dudley Sand and Gravel Co., Dudley, Mass., died January 15. He was 54 years old.

GUY BAKER, for many years secretary-treasurer of the American Aggregates Corp., Greenville, Ohio, died early in February.

NEW...

Bonus Powered too!

NEW

124 Net Engine Horsepower. In International Drott Machines, Engine develops 134 Net Horsepower.

182 Series

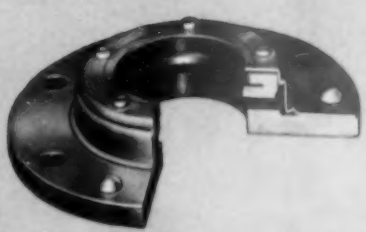
TD 18

TD-18 diesel (series 182) delivers 103 drawbar horsepower, with weight of 29,050 pounds (without equipment). All-weather electric starting, standard equipment. "New look" visibility, operating ease never before available. New heavy-duty, swinging-door type radiator guard is "standard"—for carrying heavy front-mounted equipment. Gives big tractor performance in pioneering under roughest conditions. Powers 3-yard International Drott Skid-Shovel, anywhere.

No costly delay from a "tired" or cold engine—you start fast! Famous International *gasoline-conversion* diesel starting—*actual* "in-seat" starting—is *standard equipment* on this new crawler line. With "push-button" ease, you get seconds-fast starting, whether the engine is cold, or stopped! And you're on the job seconds-fast, when minutes are dollars.

Cermametallic Engine Clutch Facings Save power, defy heat, prolong life! Uncomplicated, *familiar-to-all* engine clutch design of these new crawlers have *power-holding, heat-defying, long-lasting* Cermetallic facings. These facings reduce lever-pull up to 50%, provide amazing heat immunity, add service freedom, cut upkeep!

New . . . 500-hour lube intervals with new metal-to-metal, track roller seals! You save the time and expense of frequent inspections or lubrications, with the new *full-floating*, cartridge-type, track roller seals provided on the TD-24, TD-18, and TD-14. These precision-lapped, metal-to-metal seals are so effective they give you *safe* 500-hour intervals between roller lubrications!



Steps up a size... in job range and capacity!

50 Net Engine Horsepower. In International Drott Machines, Engine develops 55 Net Horsepower.

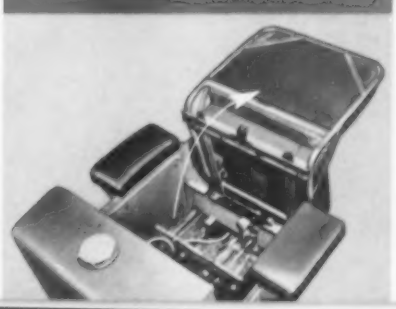
61 Series

TD 6

TD-6 diesel (series 61), 41.5 drawbar hp, up 23%! Steps up a whole size in work capacity and earning ability. Operating weight (5-roller model), without equipment, 8,890 pounds. Powers 1-yard International Drott Skid-Shovel or Four-In-One; serves as clean-up dozer unit on any-sized contract; versatility and low operating cost to do many sizes of jobs for every size of contractor.

Full-view, one-glance panel saves time—cuts effort! One quick glance at this new full-view panel, with centralized instrument grouping, gives the operator the instant check-up, to assure that lubrication, generator, and cooling system are "perking" for full production!

New Fold-over Seat Aids Fast, Centralized Servicing! New fold-over seat of the TD-6 and TD-9 models allows operator to give you the time and convenience advantages of centralized steering clutch assembly servicing. Lubricant fittings are conveniently grouped and fully accessible!



Thorough air filtration assured by new under-hood cleaner! Instead of being "in your lap," or a knee-bumping obstruction, air cleaners of the new International crawlers are side-mounted—for easy accessibility, yet out of the way. They have big capacity and high efficiency, too, for positive air filtration!

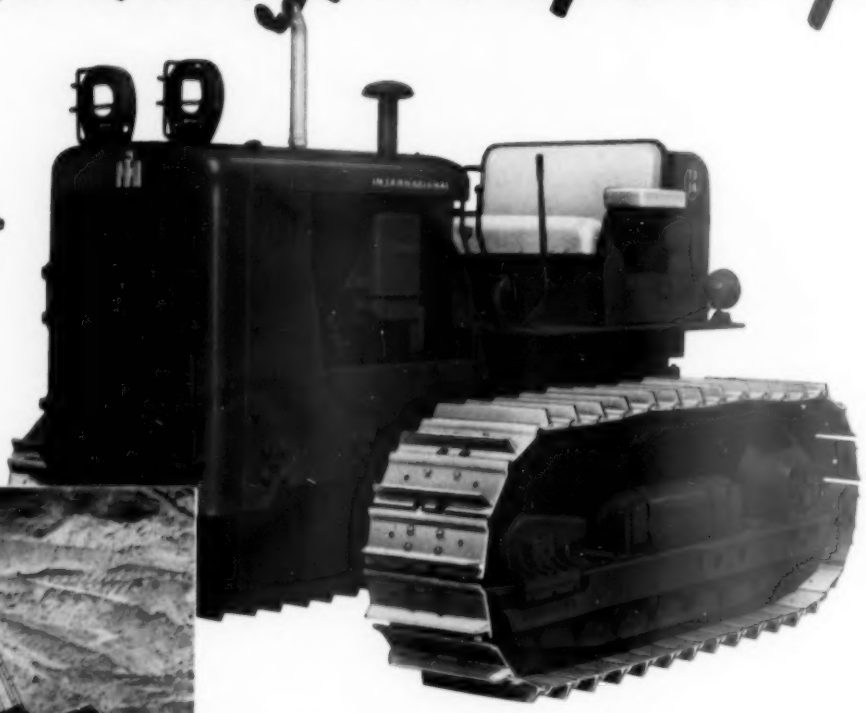
International® Crawlers giv

plus new design to speed yo

95 Net Engine Horsepower.

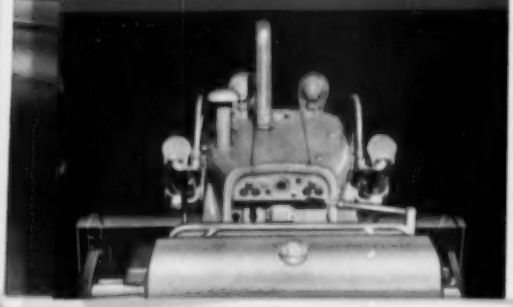
142 Series

TD 14

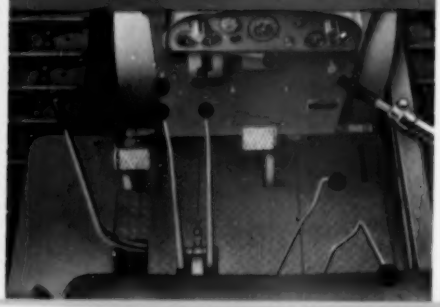


TD-14 (series 142), 78.5 drawbar hp; weighs 21,095 pounds (without equipment). Features "new look" engineering, job-speeding visibility, new equipment-carrying and operating strength. All-weather electric starting, standard equipment. It's a fast, responsive, big-capacity dozing tractor. Powers 2¼ cu. yd. International Drott Skid-Shovel or Four-In-One; 15-ton capacity Superior Pipe-Boom; other similar-sized equipment.

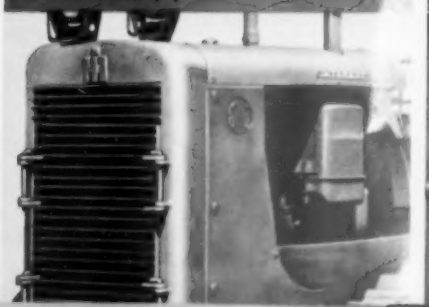
Control Tower Visibility adds operating efficiency! See how new International crawlers are streamlined for complete job-control visibility. Seat is amply high to provide full view of equipment, terrain, and variations requiring operator action, to maintain efficiency.



Clean, safe deck cleared for action! Look down on that safe, clean, flush deck—a platform for full production. The wide, man-size seat is fully-adjustable; foam rubber padded. Instruments centralized for one-glance check-up! Even a cigarette lighter is provided, to prevent needless stops!



Pressurized Closed Cooling System for Positive Performance Protection! New pressurized cooling systems provide fast warm-up under thermostatic control—and positive ideal temperature control with forced circulation through full-length jackets. That aids clean combustion, guards oil film strength, protects performance. Radiator core assembly is easily-removable, without disturbing radiator guard or mounted equipment.



ive you Bonus horsepower—
our jobs, control your costs!

66 Net Engine Horsepower. In International Drott Machines, Engine develops 71 Net Horsepower.

91 Series

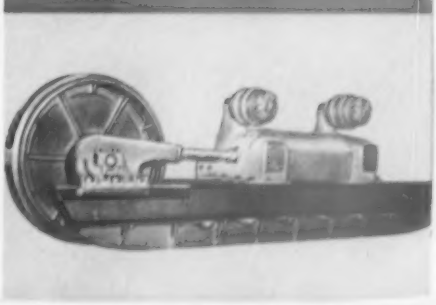
TD 9

TD-9 diesel, (series 91), delivers 54.5 drawbar hp—up 32%. Operating weight (5-roller model), without equipment, 12,000 pounds. Now up in a new heavy-duty job range. New power is backed by new power train and track frame strength, new operating and servicing ease. Powers International Drott 1½ cu. yd. Skid-Shovel and other equipment requiring similar power.

480-hr. full-flow lube oil filters guard bearings, cut upkeep! Every drop of oil on its way to lubricate moving engine parts must pass through these new abrasive-trapping micron-type filters—with the capacity, strength, and efficiency to give 480 hours of wear-fighting, upkeep-cutting duty!

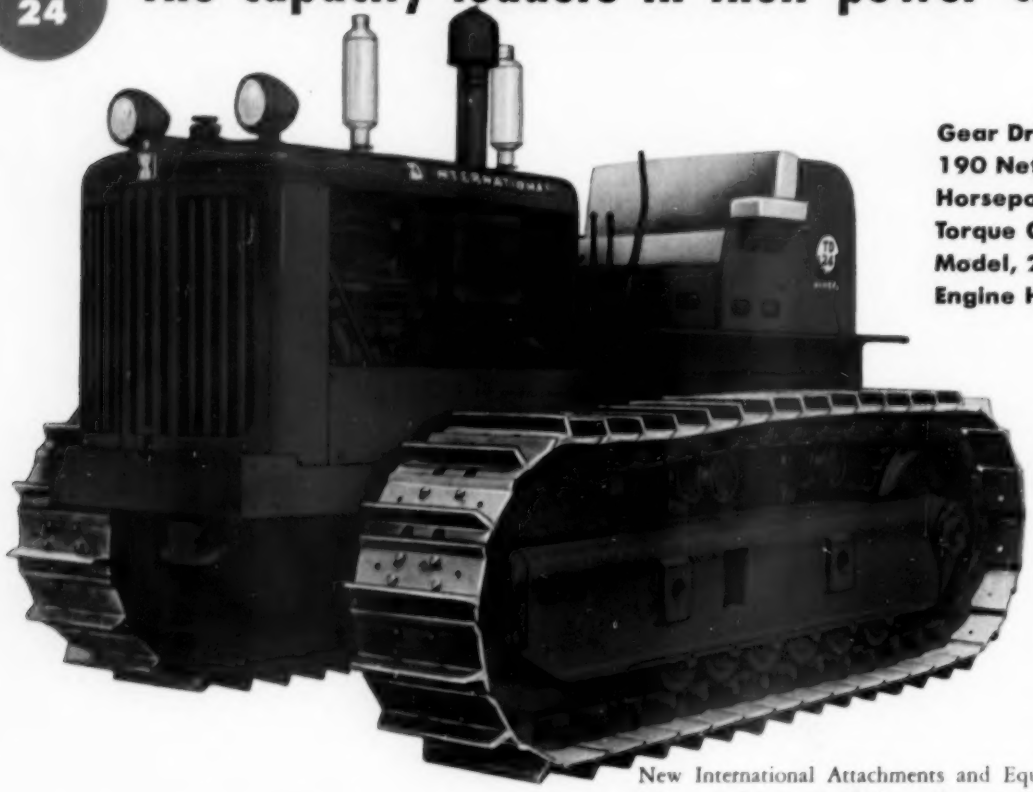
Hydraulic Power Steering Inspires Operator Cooperation! New hydraulic power steering of the TD-14 and TD-18 cuts operator fatigue—and along with the other big effort-saving advantages, makes it easier than ever to deliver full-capacity production! TD-6 and TD-9 have spring boosters to lighten the operator's job.

"Bridge-strong" track frames for "slam-bang" conditions! You are looking at the strongest track frame in the industry for crawlers of TD-18 and TD-14 size! Heavy steel box-section beams, weld-joined to heavy stress-relieved steel plates—and rigidly gusset-braced—they're your foundations for record-making "rough-and-tumble" performance!



TD 24

The capacity leaders in their power class



Gear Drive Model, 190 Net Engine Horsepower
Torque Converter Model, 200 Net Engine Horsepower

Massive—with 43,080 pounds of rock-dozing, scraper-pushing brawn (7-roller torque converter model)*—the TD-24 can give them all a lesson in operating ease, big capacity, and positive load control! Has instant high-low range and exclusive Planet Power steering to give you its tremendous *pushing*, *pulling*, and *lifting* power on any terrain—with responsiveness not available elsewhere! *Live power on both tracks, on every turn!* Backed by equipment engineered to match its strength and power!

*Gear Drive 7-roller model weighs 42,780.

New International Attachments and Equipment team with new bonus-powered crawlers to give you high-producing performance packages: 42 new Bulldozers, to fit your needs exactly . . . 4 new Drott Loaders, 1 to 3-cubic yard capacity . . . 4 new Superior® Pipe-Booms, 8 to 55-ton capacity; 3 job-proved PCU'S! . . . **Measure . . . compare . . . prove to yourself . . . new bonus-powered International crawler tractors beat anything else on tracks! Try this turnpike-paced new power for capacity, operator preference, profit potential. Ask your International Industrial Power Distributor for a bonus-powered demonstration to your specifications!**

INTERNATIONAL HARVESTER

International Industrial Power

INTERNATIONAL HARVESTER COMPANY, 180 N. Michigan Ave., Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-tired Loaders . . . Diesel and Carbureted Engines . . . Motor Trucks.

"...tops in ag-lime equipment"

"We have been using your Lippmann Pulverizer since 1946 and we like it so well that we thought we'd let you know about it. It has given us production as high as 100 ton per hour with exceptionally good wear service. We are producing Ag-Lime with your machine and we are getting almost 100 per cent production of this product. We've never had a breakdown, and only just recently replaced the rotor for the first time. In our opinion your Pulverizer (32x24) is top Ag-Lime equipment."

(Signed) ELMER BECKER
BECKER AND TUCKWOOD
Lancaster, Wis.

LIPPMANN
AG-LIME PULVERIZERS

"Good production... excellent wear service" says Robert Ivey

"Our Lippmann Pulverizer has been working so well for us that we thought we would tell you how completely satisfied we are with it. While it is only an 18" (32 x 18) wide machine we still get 80 tons of ag-lime from it per hour. That in our opinion is real production. Besides, we have not had a bit of trouble, so in addition to getting good production we are getting excellent service wear as well."

(Signed) ROBERT IVEY
IVEY CRUSHING & CONSTRUCTION CO.
Mineral Point, Wis.

There are good reasons why Lippmann Pulverizers get enthusiastic endorsement everywhere they are used. Upswing hammer efficiency gives more impact to break stone faster, eliminate drag and reduce abrasive wear. Heavy, solid steel flywheel and dynamically balanced rotor provide greater momentum, reduce vibration and conserve power.

Non-choking steep feed chute, small uniform hammer clearance and special angle breaker plate design all add to the production capacity of these Pulverizers. Special hammer design, tough forged hammer arms, oversize bearings and shaft provide longer wear service. Remember too, Lippmann Pulverizers produce just about 100% minus 8-mesh ideal ag-lime product — another reason for their wide popularity.

Bulletin 1160 contains many other reasons why Lippmann Pulverizers (sizes range from 24 x 12 to 40 x 36) are tops with ag-lime producers. Get your copy and full information from your local Lippmann Distributor, or write to Lippmann Engineering Works, 4605 W. Mitchell St., Milwaukee 14, Wis.

1160—56—6

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LIPPMANN
SINCE 1923
CRUSHERS FEEDERS SCREENS CONVEYORS CRUSHING & WASHING PLANTS

Lighten your maintenance cost load

Even in off-highway service, *Texaco Marfak* gives chassis parts full protection. That's because heavy loads won't squeeze it out, bumpy roads won't pound it out. You get long extra life for all chassis parts because of *Marfak's* longer lasting protection against wear and rust.

In wheel bearings, use *Texaco Marfak Heavy Duty*. It seals out dirt and moisture, seals itself in to assure extra thousands of miles between lube jobs, extra long life for bearings, extra safety in braking. No seasonal change is required.

More than 625 million pounds of Texaco Marfak have been sold

Also use: *Texaco Track Roll Lubricant* to reduce maintenance costs of your crawler mechanisms. *Texaco Universal Gear Lubricant EP* to assure smooth functioning transmissions and differentials.

Call on Texaco Lubrication Engineering Service for help in simplifying and improving your maintenance lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

NEW, MULTI-PURPOSE!

For contractors who want *just one* lubricant to handle chassis, wheel bearing, water pump and other grease lubrication, there is the new lithium-base *Texaco Marfak Heavy Duty Special 2*. It pumps easily and lubricates effectively even at winter temperatures. It resists water washing and stands up in severest service.

TEXACO **TEXACO Lubricants and Fuels**
FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

INDUSTRY NEWS

Cover Picture

ON THIS MONTH'S COVER is shown the extensive stockpiling facilities of of Chattanooga Rock Products Co., Chattanooga, Tenn. There are six stone sizes in open piles over the reclaiming belt conveyor tunnel and two sizes in concrete stave silos. The plant is divided into four major sections, each with vibrating screens mounted over truck and storage bins. In addition to construction and paving materials, the company is an important producer of agricultural limestone. Aggregates also are supplied to an adjacent bituminous mix producer.

Expands Cement Facilities

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., recently announced a program to double the production capacity of its Brandon, Miss., cement plant and to increase its river distribution system with a major cement handling operation at Vicksburg, Miss. Addition of a 450-ft. kiln and related equipment will increase the plant's capacity from 1,250,000 bbl. to 2,500,000 bbl. of cement annually. The expansion is scheduled for completion by May, 1957.

The company will build a barge loading terminal on the Yazoo canal site in Vicksburg, as well as a fleet of river barges. These facilities will service large construction jobs along the Mississippi River between Helena, Ark., and Baton Rouge, La.

Expands Refractory Production

KAISER ALUMINUM & CHEMICAL CORP., Kaiser Chemicals Division, Oakland, Calif., has announced an expansion program, costing about $3,000,000, increasing its production capacity for refractory and magnesia products. New facilities will be added to the seawater magnesia plant at Moss Landing, Calif., and the basic refractories plant being built at Columbiana, Ohio. The present seawater handling capacity will be doubled at the Moss Landing plant, and its periclase production capacity will be doubled. A rotary kiln will be installed at the plant, that will have an approximate capacity of 150 tons of magnesia products daily, bringing total daily kiln capacity to about 375 tons.

Additional pressing and materials handling facilities are being installed at Columbiana, increasing the plant's capacity by about 50 percent. The plant, currently being built, is scheduled for completion by June 1, 1956, and the additional facilities installed by January 1, 1957.

The program is the second major expansion undertaken by the division during the past two years. Kaiser Chemicals Division manufactures 40 different products, the major products being basic refractory materials in the form of brick, ramming mixes and mortars made to withstand extremely high furnace temperatures.

Builds Sand Plant

NORTH LITTLE ROCK SAND CO., Rose City, Ark., is building a sand plant at North Little Rock, Ark., costing about $125,000. The plant will produce concrete and plaster or masonry sand, dredging over 120 t.p.h. from the Arkansas river. The sand will be drawn through an 8-in. pipeline laid from a 40-ft. barge, and piped to the plant. Officers are John Ott, president, W. F. Tracy, vice-president and general manager, Clifford Van, second vice-president, and Charles Imhoff, secretary-treasurer.

May Enter Gypsum Industry

JOHNS-MANVILLE CORP., New York, N.Y., recently announced that it has received an option to explore a large gypsum deposit in southern Nevada, and is considering entering the gypsum field. The company said it also is examining additional gypsum deposits in other sections of the country. The Nevada deposit is between Las Vegas and Henderson. If the company does begin gypsum operations, it would supplement its present line of building material products with products such as gypsum board, plaster lath and gypsum sheathing.

Quarrying Continues, Despite Flood

CALAVERAS CEMENT CO., San Francisco, Calif., recently drained 400,000,000 gal. of water from its quarry, after it was flooded by Old Gulch Creek, without a loss in production. The possibility of flooding had been anticipated, however, and all equipment had been removed from the quarry floor. A diversionary channel was dug, about half a mile long, 15 ft. wide and 10 ft. deep. Quarry crews worked around the clock to build a 2000-ft. levee and 500-ft. canal. The company secured 18 pumps, some of them borrowed from tugs in San Francisco Bay, to pump out the water, and one month after the flooding, quarry operations were back to normal.

Adequate reserves of limestone were

Seven of the 18 pumps used to clear the Calaveras quarry of water are shown above. The water had already begun to recede

Gardner-Denver . . . Serving the World's

NEW super portable

ROTARY 900 SPECIFICATIONS:

Compressor Model	RP900DA
Delivery, cfm	900
Operating Pressure, psi	100
Control	*New* Simplified Thriftmeter
Length	13′ 9″
Width	6′ 9″
Height	8′ 5″
Turning Radius	18′
Weight, dry	12,790 lb.

Gardner-Denver Rotary 900

Gives you—Extra air capacity for bigger drills or more of 'em—without additional engines and equipment to care for. For heavy rock cuts, for quarries, for open pit mines—wherever compressed air in volume can help speed the work.

Plus—all the outstanding Gardner-Denver features which have made the Gardner-Denver Rotary 600 so popular among users. Clutch for easy cold-weather starting. Circulating water system for warming up the compressor before it turns over. Water-cooling for steady running in any weather. Super-simplicity for complete inspection, easy field maintenance.

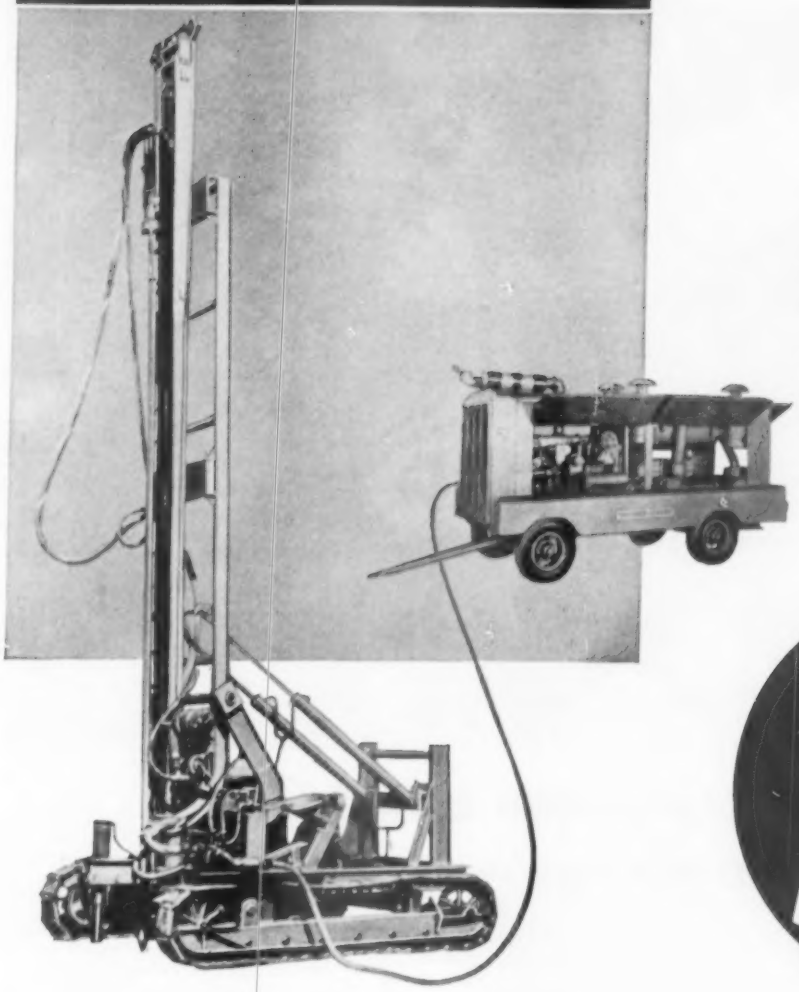
GARDNER - DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Basic Industries



DH143 SPECIFICATIONS:

Hammer Diameter	5½"
Drill Rod Size	1⅞" hex.
Approximate Weight, complete crawler-mounted drill	10,500 lb.
Rod Change, up to	20'
Height, Mast at Vertical	29'
Length	11'
Width	8½'

NEW *super* rock drill

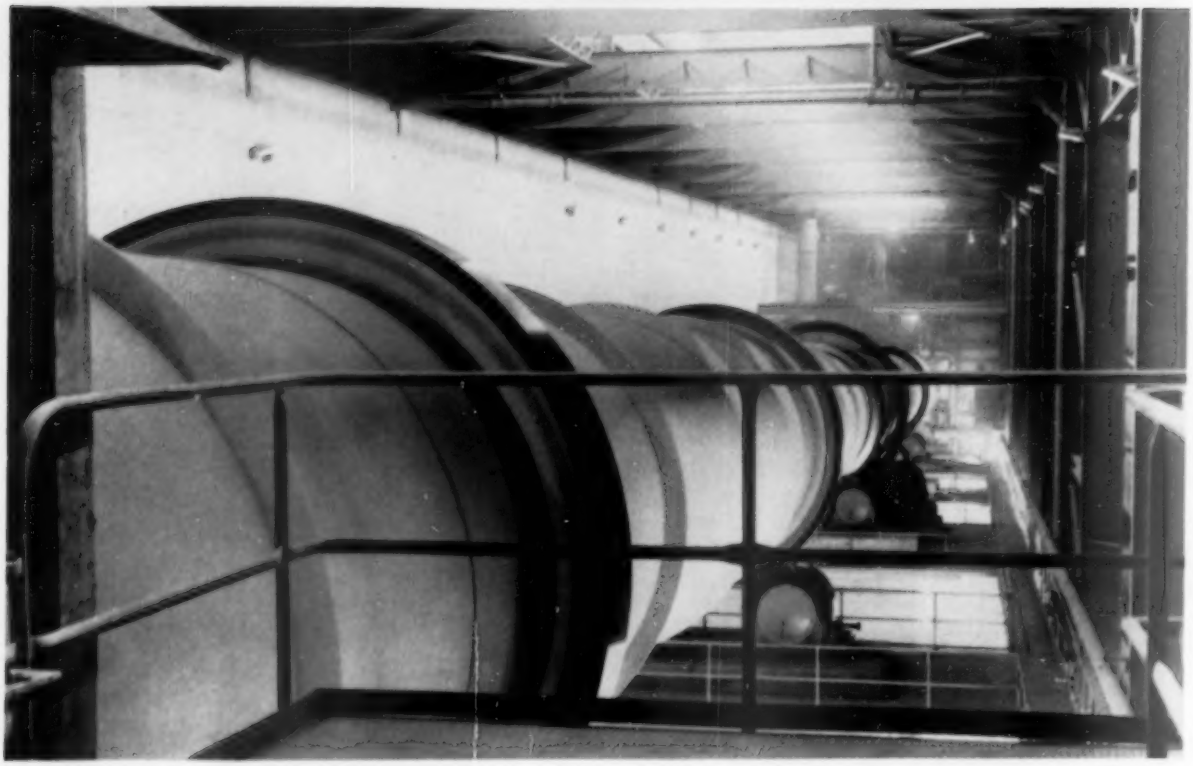
Gardner-Denver 5½" DH143

Gives you—an entirely new rock drill class for heavy-duty rock work in pits, in quarries, in open cuts. Now you can select the proper bit size and plan the proper hole spacing for best breakage in any ground. Simplified operation—all controls are conveniently mounted at the operator's station.

Plus—The dependability, economy and hole-cleaning ability which have made Gardner-Denver Rock Drills famous wherever rock work is encountered. Available with a new Gardner-Denver air-powered crawler, or for mounting on your own heavy diesel tractor. Send for the facts today!

There's a Gardner-Denver distributor in your area—
see him for details

Profitable trends in the use of refractories



Cement plant expansion aided by Laclede's 'one-package' refractory service

To help you meet expanding cement and lime needs, make profitable use of Laclede-Christy's 'one-package' service. This service does more than satisfy your refractory requirements. Certainly you obtain highest quality fire clay refractories—alumina liners (40% to 70%), castables, plastic and all special and standard refractories—for rotary kilns, hoods, clinker coolers, and other uses.

You may also obtain extra Laclede service. Laclede ceramic engineers, modern research facilities and technically trained personnel are on hand to help you solve special problems.

Laclede-Christy's nearby stock locations mean prompt delivery—of one or several types of refractories.

Next time you need refractories, call your Laclede man. Or, contact headquarters to help satisfy your specific needs.

Laclede-Christy Refractories for the Cement and Lime Industry

Laclede 70 (70% Alumina) — particularly suited for hot zone liners in cement, lime, dolomite and magnesite kilns.

Laclede Peerlac (60% Alumina) — for kiln areas requiring lining materials of higher refractory value than high duty and super duty fire clay brick.

Laclede Kiln Liners for all intermediate and cold zone applications.

Laclede Plastic Refractories for hoods and stationary clinker cooler arches.

Laclede Castable Refractories for kiln hoods.

Suspended Arches for stationary clinker coolers.

LACLEDE-CHRISTY COMPANY DIVISION

LACLEDE-CHRISTY COMPANY — Quality First — HKP

H. K. PORTER COMPANY, INC.
2000 Hampton Ave. · St. Louis 10, Missouri
Mission 7-2400

on hand to supply requirements at the cement plant, and during the flood quarry operations continued on accessible deposits on high land. The quarry project was carried out under the direction of Louis Allsman, quarry superintendent, and Earl Bagley, his assistant.

Increases Production Capacity

DIAMOND ALKALI CO., Cleveland, Ohio has approved plans for increasing production 42 percent at the Standard Portland Cement plant in Painesville, Ohio, according to an announcement by L. T. Welshans, general manager of the Cement-Coke Division. A lime kiln will be converted to cement clinker production, resulting in an 800,000 bbl. annual increase in cement capacity. Other equipment to complement the cement kiln includes an electrostatic dust collection system, stone and clay mills, a large finish cement mill, and additional storage for slurry and cement clinker. The new installation, integrated with present facilities, will increase the company's cement production from 1,900,000 to 2,700,000 bbl. annually, in time for the 1957 construction season.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY of 1954, 23,826,000 bbl. of finished cement in November, 1955, as reported by the Bureau of Mines. This was an increase of 4 percent over November, 1954. Mill shipments totaled 21,682,000 bbl., a decrease of 5 percent compared to the November, 1954, figures, while stocks on hand for November, 1955, were 9 percent more than on the same date in 1954. Clinker production during November, 1955, amounted to 25,618,000 bbl., an increase of 8 percent over the November, 1954, figure. The output of finished cement during November, 1955, came from 156 plants in 37 states and Puerto Rico. During the same period of 1954, 23,826,000 bbl. of finished cement were produced.

Plans Bentonite Plant

THE AMERICAN BENTONITE CO., OF UTAH, recently leased 13,000 acres of land west of Thermopolis, Wyo. The company has started strip mining operations on the land, and plans to build a bentonite processing plant in Thermopolis if the mining operations are successful.

Plans Cement Plant

GENERAL PORTLAND CEMENT CO., Chicago, Ill., is planning a cement plant on a 2490-acre tract 19 miles west of Miami, Fla., costing about $10,000,000. Smith W. Storey, president, said the plant will produce 1,250,000 bbl. of cement annually. The company has been operating in Florida since 1927, with a plant at Hookers Point near Tampa, the state's first cement plant.

May Build Cement Plant

RIVERTON LIME & STONE CO., INC., Riverton, Va., announced it is considering construction of a portland cement plant on its Riverton property, costing about $10,000,000. Plans call for a plant with an annual production capacity of 1,500,000 bbl. of cement. The firm operates two plants, one quarrying and processing a feldspar mineral for the glass industry and the other producing rock wool and crushed stone products.

Expands Cement Plant

OREGON PORTLAND CEMENT CO., Lime, Ore., has announced plans for expansion of its cement plant at Lime, at a cost of $3,114,572, to provide cement requirements for the Snake River Dam, being built by the Idaho Power Co. F. E. McCaslin, president, said the expansion will double the capacity of the plant and bring its production up about 1,000,000 bbl. of finished cement annually.

Markets Dust Collector

SOUTHERN LIGHTWEIGHT AGGREGATE CORP., Richmond, Va., has established a process engineering division, headed by Harry E. Seifert, formerly director of the Bureau of Industrial Hygiene of the Virginia Department of Health. The division will market a wet dust collector which was developed by the company's production department to meet its own needs in the collection of atmospheric dust from smoke stacks of its kilns where slate is subjected to heat of about 2000 deg. F.

Harry E. Seifert

The unit, developed after various commercial collectors failed to stand up under gases and abrasion at one of the company plants, is built of wood treated to withstand heat and acids. No nails are used inside the collector, and wooden pegs hold the fir planks in place. The mounting is sloping concrete with an overflow drain. Nozzles, secured by plastic holders, spray and

Before (top) and **after** (bottom) installation of dust collector at rotary kiln plant, Southern Lightweight Aggregate Corp.

Big production: at the Camp Dennison, Ohio, plant, a 2¼-yd. Michigan loads out a heaping bucket load of frozen aggregate. Power-shift transmission is standard equipment—cuts seconds off every cycle between truck and pile

$76,000* buys *one* 2¼-yd. truck crane or *four* 2¼-yd. Michigan Tractor Shovels . . .

Here's why Ohio Gravel Co. bought the four Michigans

Ohio Gravel Company operates five plants around the perimeter of Cincinnati. Until a short time ago, ½-yd. and ¾-yd. clamshells and shovels handled all loading from stockpiles. When it became apparent that the Miami plant (300 t.p.h. capacity) did not have adequate loading capacity, Ohio Gravel asked for bids on a special 2¼-yd. mobile crane. According to Walter Flach, V. P. Production, they recognized the need for bigger bucket capacity and better mobility between stockpiles. Bids on the crane ran from $65,000 to $76,000—a substantial price to pay for increased capacity in *only one of the five plants.*

Had to leave the demonstrator

At this point Bode-Finn Co., the local Michigan distributor, got permission to demonstrate a 2¼-yd. Michigan Tractor Shovel at the Miami plant. The "demonstration" lasted two weeks—that is, Ralph Hautman (Miami superintendent) wouldn't

*Current list price F.O.B. factory for four 2¼-yd. diesel Michigan Tractor Shovels.

let them take the demonstrator away until a permanent machine was delivered. Before the new Michigan even arrived, Ohio Gravel Company bought three more for other plants. *The total cost of the four Michigans was approximately the same as the one crane.*

Loads as much as two cranes

At the four plants with Michigans, the superintendents agree that one Michigan loads trucks as fast or faster than two ¾-yd. clamshells. With widely separated stockpiles, the Michigans move around the yards as fast as the incoming trucks—27 mph top speed. They consistently get heaping bucket-loads. Power-shifted cycles between pile and truck average about 40 seconds; it takes 4 minutes or 6 bucket-loads to put 19 tons into a dump trailer (see picture).

A typical heaping bucket-load of graded bank run comes up well over the 2¼-yd rated bucket capacity. Digging bank run, the Michigan handles approximately 5½ tons per bucket-load.

Handling clean-up work in its spare time, the Michigan eliminates stockpile contamination. Unlike the clamshells which formerly handled the job, the Michigan does not pick up dirt as it cleans up around the piles.

More profits for producer and trucker

Faster travel, faster cycles, bigger bucket-loads obviously make more profits for producer and trucker alike. Ohio Gravel Company recognized this fact when the first Michigan was demonstrated. Your own Michigan distributor will give you this same kind of proof. A chance to demonstrate is all he asks—*you name the job.*

Michigan is a registered trade mark of

CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road
Benton Harbor 18, Michigan

It took four minutes to put 19 tons of material into this dump trailer. Six bucket loads filled it. Note that the 2¼-yd. Michigan has plenty of dumping clearance over the 10-ft. high side boards. Even with batch boards in place, the Michigan has no trouble.

Automatic Precision Fine Grinding

produces more, faster and cheaper

WILLIAMS roller mills

Uniformly accurate grinding—from 20 mesh to micron sizes! Operation is completely automatic from raw material feed through blending, grinding, sizing and delivery of finished product.

Adjustment for size control made instantly while mill is in operation . . . feed rate is entirely self-adjusting . . . operation is completely dustfree . . . continuous upward air current prevents build-up of fines that impair operation, and carries ground materials to classifier where finished material is discharged and oversize tailings are returned for further grinding . . . takeup for wear is continuous and automatic. Automatically controlled hot air can be introduced for simultaneous drying and increased grinding of materials containing moisture.

Get full details of these and many other Williams features . . .

Write for NEW catalog

WILLIAMS *NEW* GEARLESS AND SPUR GEAR DRIVES

One of the industry's most outstanding advancements. Cross section of Type D Mill with Spinner Air Separator shows spur gear and pinion drives used on Standard and larger sizes. (Smaller sizes use no gears but have V-belt drive). This type drive is simpler and easier to maintain than bevel gear drives and prevents leakage of material into gear lubricant. Bearing alignment of central shaft is simplified with only two bearings, the bottom one carrying thrust as well as radial loads. Note flow of material being ground by rolls rotating against bull ring, then air swept to separator which discharges fines; returns coarse material for regrinding.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 St. Louis Ave. St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

Hammer Mills Helix-Seal Mills Air Separators Vibrating Screens Feeders Impactors

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

fog the hot gases which are guided in the desired pattern by baffles built inside the collectors. According to J. W. Roberts, president, the collector is self-cleaning and even after a year and a half in operation had no accumulation of solid material.

Cement Plant Closes One of Three Kilns

ARIZONA PORTLAND CEMENT CO., wholly-owned subsidiary of California Portland Cement Co., Los Angeles, Cailf., has closed down one of its three kilns at the cement plant in Rillito, Ariz. A third kiln was added to the plant last July to boost daily production from 4000 to 7000 bbl. daily and sack output from 16,000 to 28,000 daily.

The company recently began production at a new plant in Mojave, Calif., and also operates a plant at Colton, Calif. Freight costs prevent the Arizona plant from shipping cement to California markets, according to Edward R. House, treasurer of the cement company.

Canada Cement Outlook

CANADA CEMENT CO. LTD., Montreal, Que., Canada, will have made capital expenditures of $86 million since the end of the war, which includes $21 million scheduled for 1956, according to J. M. Breen, president. Annual capacity will have been raised to 24,000,000 bbl. from about 10,000,000 bbl. By the end of 1956, Mr. Breen said, total productive capacity of the Canadian cement industry will be about 37,000,000 bbl., exceeding anticipated consumption by a wide margin. In 1955, cement consumption in Canada amounted to 27,000,000 bbl., a record high. "Accordingly," Mr. Breen said, "from 1957 on, the problem facing us will be to keep plants operating at capacity levels."

Buys Two Tracts of Land

OHIO GRAVEL CO., Cincinnati, Ohio, has purchased a 44-acre tract of land at Newton, Ohio, from Willy-Ruckstuhl Co., and another 34 acre tract of land at Anderson Township, from William Barber. Fred W. Cornuelle, president of Ohio Gravel, said a sand and gravel plant would be built on the Newton property, with a daily production of 2000 tons. The company has four other plants; at Miamiville, Camp Dennison, Cleves and Miamitown, Ohio.

Moves Sales Office

HURON PORTLAND CEMENT CO., Grand Rapids, Mich., has moved its district sales office in western Michigan to 11 Fuller Ave., S.E., Grand Rapids 6, Mich.

N.L.A. Meeting Site Changed

THE NATIONAL LIME ASSOCIATION has changed the site for its annual convention, to be held April 19-21, 1956, from the Homestead, Hot Springs, Va., to the Boca Raton hotel, Boca Raton, Fla., midway between West Palm Beach and Ft. Lauderdale, Fla. Preceding the convention, a board of directors meeting will be held April 18.

The main topic to be discussed at the meeting will involve the growing use of lime, tieing in with the association's promotional program on lime stabilization. Conard M. Kelley will report on his promotional accomplishments during the past six months, and will also serve as moderator of a panel discussion on the aspects of lime stabilization.

Other speakers include: Robert Pflaumer, president, American-Marietta Corp.; John C. Best, former vice-president, National Gypsum Co., who will talk on arbitration; Dr. A. P. Black, water plant consultant, University of Florida, who will discuss his newly devised method of adding pulverized quicklime without slaking for water softening; B. J. Geen, director, Settle Limes, Ltd., England, on foreign lime developments; S. X. Bessen, Komline-Sanderson Co.; Walter C. Voss, professor emeritus, Massachusetts Institute of Technology, who will talk on "The Truth Will Out."; and J. M. Cooper, association tax counsel, who will discuss percentage depletion developments.

Amos B. Miner, president of the association, and Robert S. Boynton, general manager, will give reports on association activities. Social activities will include a golf tournament and a steak fry on the beach, both at the Boca Raton hotel; a cocktail party and banquet; and a post-meeting "deep-sea" fishing expedition.

Illinois Mineral Production

ILLINOIS STATE GEOLOGICAL SURVEY, Urbana, Ill., has published Circular 206, "Mineral Production in Illinois in 1954" by W. H. Voskuil and W. L. Busch. The 59 page report covers such industrial minerals as limestone and dolomite, sand and gravel, industrial sand, lime, and cement, as well as coal, coke and petroleum.

•

THE MANN CONSTRUCTION company of Red Wing, Minn., has opened a quarry on the Laura Nelson farm, east of Zumbrota, Minn., to supply about 20,000 cu. yd. of crushed stone.

Coming Conventions

April 9-10, 1956—
Texas Concrete Masonry Association, Spring Meeting, Hotel Stephen F. Austin, Austin, Texas

April 12-14, 1956—
American Concrete Agricultural Pipe Association, Sixth Annual Convention, Brown Palace Hotel, Denver, Colo.

April 13-14, 1956—
Texas Aggregates Association and Texas Ready Mixed Concrete Association, Joint Annual Convention, Statler Hilton Hotel, Dallas, Texas.

April 19-21, 1956—
National Lime Association, Annual Convention, Boca Raton Hotel, Boca Raton, Fla.

April 23-25, 1956—
Autoclave Building Products Association, 50th Annual Convention, Hotel Statler, Detroit, Mich.

May 16-18, 1956—
Prestressed Concrete Institute, Second Annual Convention, Hollywood Beach Hotel, Hollywood, Fla.

June 17-22, 1956—
American Society for Testing Materials, 59th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Now a new **TDA®** *lightweight tandem that features . . .*

UNEQUALED PARTS INTERCHANGE-ABILITY

Uses many standard parts for faster service ...new lightweight design gives 7500 extra ton-miles of payload a year*

Longer service, simpler maintenance! Most wearing parts used in this new tandem are identical to parts in widely used Timken-Detroit® standard single axles. This use of standard gears, pinions, differentials, bearings and brakes means more time on the road for operators . . . reduces parts inventories . . . and speeds service.

7500 extra ton-miles of payload a year! This new TDA tandem is over two hundred pounds lighter than any other unit of the same capacity. During an average 75,000 mile year, an operator can save 7500 deadweight ton-miles. This deadweight can be replaced with vital payload that adds up to important extra profit.

Available with a choice of either Timken-Detroit Axle connecting groups, or brackets to accept other approved chassis hook-up parts . . . plus all these additional advantages with the Timken® lightweight tandem:

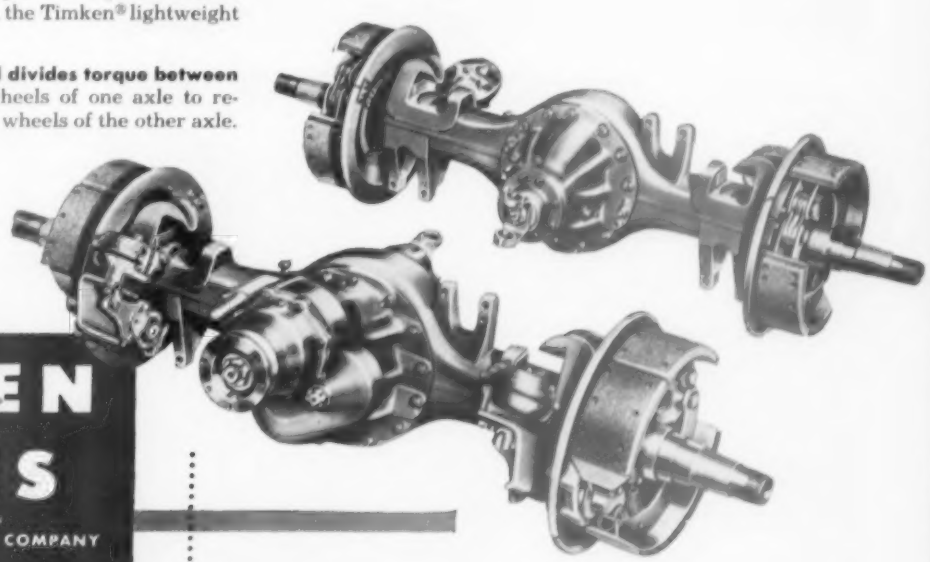
TDA Inter-Axle Differential divides torque between axles—and yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work—driving parts and tires last longer!

Driver-Controlled Lockout. With TDA inter-axle differential, the driver can obtain the advantage of straight-through drive under slick or icy conditions by locking out the differential at *any* driving speed.

Big, dependable hypoid gears rotate in conventional direction, for maximum gear and bearing life.

This new highway tandem insures new payload profits, faster, easier service and operating economies for truck operators everywhere. For complete information contact your vehicle dealer or branch.

*based on 75,000 highway miles a year.



TIMKEN Detroit AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted Standard — TRADE MARK REGISTERED

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSES AND TRAILERS

Plants at:
Detroit, Michigan • Oshkosh, Wisconsin
Utica, New York • Ashtabula, Kenton and Newark, Ohio
New Castle, Pennsylvania

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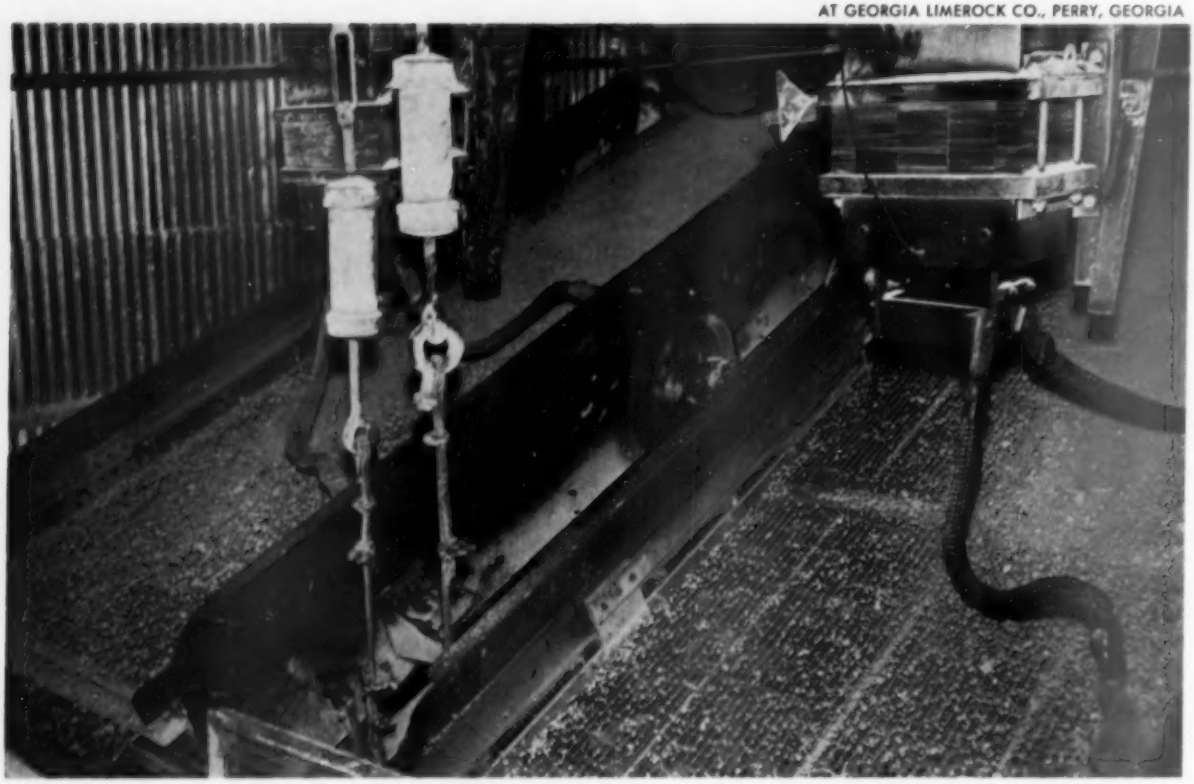
PRODUCTION UP 35% WITH 2 SECO SCREENS

AT GEORGIA LIMEROCK CO., PERRY, GEORGIA



GEORGIA LIMEROCK NOW GETTING MORE UNIFORM PRODUCT

How would you tackle the job of screening a soft, calcareous lime that is very sticky due to moisture content? At Georgia Limerock, two SECO electrically heated screens, purchased through Merts Equipment Company at Albany, Georgia have solved a problem which this operator had previously thought insolvable.

In the first place, the production of finished product has been increased by approximately 35%. The SECO screens with electric wire cloth heater units are so efficient that the damp, sticky, soft material gets through the meshes with little or no carryover of fines. (Note the discharge ends of the screens in the photo above.)

As important as this increased production is, even more important to Georgia Limerock is the more uniform finished product they are now able to sell their customers. They know, as you know, better products build better businesses.

Send for Catalog No. 204

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

Don't Let A Sticky Screening Problem Rob Your Profits!

Whether it's ag-lime, sand, or any other material, SECO engineers welcome the opportunity to help you. SECO builds over 350 single, double, triple and three and one-half deck models. Write, wire or phone.

SCREEN EQUIPMENT CO., INC.

Buffalo 25, N. Y.

HINTS AND HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Cleaner Conveyor Belts

IN THE ILLUSTRATION, an arrow points to a wide launder under the main belt conveyor that delivers a soupy pit-run material to the rotary scrubber which is the first operation in the plant. The launder serves two purposes; water sprays on the underside of the belt are used and the spout deflects the water to waste, and as the sand screws are just below the belt, the spout helps keep foreign material out of the screws. Part of the sand dewaterers are also covered as a further protection from foreign inclusions.

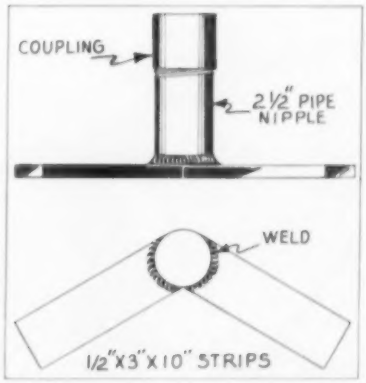
Launder under conveyor belt keeps foreign material out of sand screws

Safer Drill Operation

By PAUL C. ZIEMKE

TO PREVENT ACCIDENTS to the feet of jackhammer drill operators, particularly in the winter when slippery conditions prevail, a novel idea was worked out in a southern quarry to make the drill bit stay "put." A rubber pad with a hole cut in the center and a slit leading out to the perimeter, is slipped over the drill rod and slid down on the coupling top where all the "slop" is retained as the hole is purged with the air jet through the hollow steel. In dry drilling, it keeps the dust from rising up in the operator's face.

In practice, the driller slides the device over the spot marked for the drill hole, the drill bit is dropped down the coupling and sleeve, and the operator's feet are placed firmly on the two wings



Jackhammer drill arrangement to prevent slipping accidents by operator

to steady them and prevent sliding on insecure ground. With the washer in place, the air is turned on full without delays resulting from fitchering, bashing rubber-boot covered toes without steel toe protection or slipping off the rock completely when drilling near the face.

Field Loading Hopper

DRAGLINES WORKING IN A SAND AND GRAVEL DEPOSIT can load direct to trucks, but it is often an advantage to load to a field hopper. This permits the digging unit to operate continuously. Such a field hopper should be portable to some extent. The one shown is mounted on steel skids.

The discharge gate of the hopper resembles the bottom dump arrangement of some trucks. The Hendrix bucket is suspended from a Bucyrus-Erie dragline and the field hopper is made by the Shovel Supply Co. Euclid trucks are used for haulage from the hopper.

Surge hopper permits continuous operation of dragline

Covered Sand Screws

THERE IS NOTHING THAT WILL RAISE THE IRE of a plasterer more than to have over-sized or foreign particles in the mortar. Clean sharp sand without undesirable materials in it can be an important sales advantage.

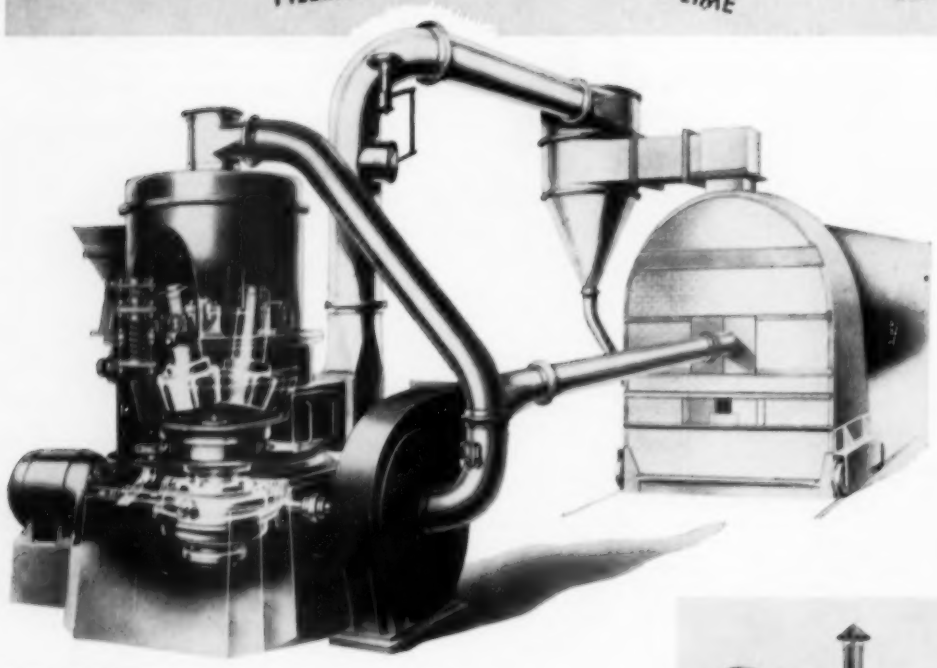
One western producer thinks enough

(Continued on page 57)

To prevent foreign materials falling into 20-in. by 15-ft. sand screws, they have been completely covered

Specify RAYMOND Pulverizing Equipment

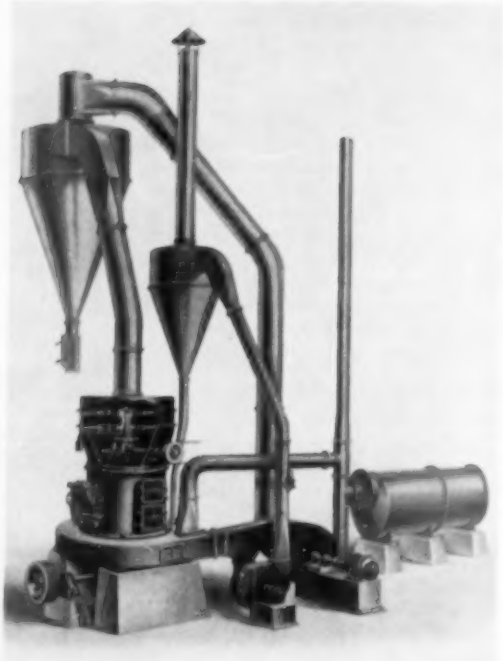
AGSTONE FILLERS BURNT LIME DOLOMITE



Complete and fully coordinated system of coal pulverizing and direct-firing rotary kilns with panel board control for single or multiple installations.

BOWL MILL FIRING
For Rotary Lime Kilns

Today's highly developed direct-firing unit for handling coal of any grade or moisture content. One of the easiest type of mills to adjust or lubricate while running. Record economies in operation and maintenance demonstrated by more than 2000 Bowl Mills in use.



RAYMOND ROLLER MILL
For Drying and Grinding

Equipped with Flash Drying Accessories and package type furnace unit for removing surface moisture while pulverizing. Standard in the industry for over half a century for grinding limestone, dolomite and many other non-metallic minerals. Whizzer separation insures close fineness control, ease of adjustment and high capacity.

C-E

SALES OFFICES IN PRINCIPAL CITIES

COMBUSTION

RAYMOND DIVISION

For Low-Cost Production of Lime Materials

SPRAY LIME CHEMICAL HYDRATE MASON'S LIME HYDRATED LIME

WHEN you install Raymond equipment, you have the advantage of selection from a wide range of sizes and types of mills and separators to fit your particular production job.

You also have the benefit of exclusive Raymond designs and continuous improvements over the years to assure flexibility of control and highest efficiency in operation.

The Raymond line provides simple units for grinding or disintegrating and classifying . . . or complete systems for handling the material automatically from feed hopper to finish bin—drying, pulverizing, blending, separating, cooling and conveying the finished material to storage in a single, continuous, dustless process.

Why not find out how you can produce powdered materials on the most modern and economical basis! Write for full information, and let Raymond engineers recommend the proper equipment.

Equipped with integral Whizzer Separator for maximum flexibility of fineness control.

AUTOMATIC PULVERIZER
For Hydrated Lime

The standard unit in the industry for disintegrating and classifying hydrated lime with rejection of impurities to produce the finest grades.

WHIZZER SEPARATION
of Lime Products

Double Whizzer-type Mechanical Air Separator for classifying hydrated lime and limestone products—and for dedusting operations to remove unwanted fines. Full range of sizes from laboratory units to 18-foot diameter Separators.

WHIZZER TYPE IMP MILL

Compact grinding unit for many special operations, including the removal of large percentages of moisture while pulverizing the material.

Write for Bulletins of Raymond equipment, in which you are interested.

SINCE 1887

ENGINEERING, INC.

1307 NORTH BRANCH STREET • CHICAGO 22, ILLINOIS

The "General" commands an army of experts,
backed by expanding resources.
He is at your service.

General Cable... *at your service!*

LIVE BETTER . . . ELECTRICALLY!

GENERAL CABLE CORPORATION, 420 LEXINGTON AVE., NEW YORK 17 • OFFICES AND DISTRIBUTION CENTERS COAST-TO-COAST

of keeping the goodwill of his customers that he has covered completely the twin Telsmith sand screws so that nothing can fall into them.

Hauling Jetty Stone

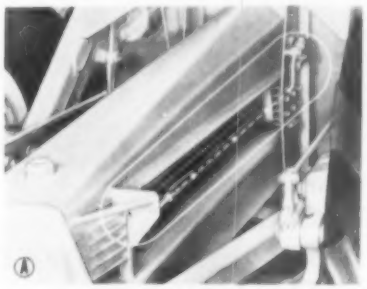
FLAT BED TRAILERS are used by an eastern traprock firm to deliver jetty stone to Atlantic coastal cities. Individual pieces up to 10 tons in size can be handled. This method permits easy loading and unloading, compared to using dump trucks or gondolas. The trailers are loaded on the quarry floor by cranes.

Flatbed trailer used to haul jetty stone

Extend Life of Cables

CABLE is normally considered an expendable part of a scraper or cable-controlled bulldozer, but its usable life can be extended by good maintenance practices and a good operator.

M. W. Dargel, assistant manager, service department, Caterpillar Tractor Co., points out that an experienced operator will check for cable wear at the cable drum. Wear occurs more rapidly here because of the overlapping or "wiping" action of the cable as it wraps around the drum. The wiping action of the cable causes it to fray and frayed sections or kinks in a cable are the points at which a cable is most likely to break. However, the kink can often be straightened before the cable is too severely damaged. Kinking is caused by improper operation of the cable control which, in most cases, can be attributed to faulty adjustment of the cable control clutch and brake. Their incorrect adjustment allows excess cable to unwind from the drum.



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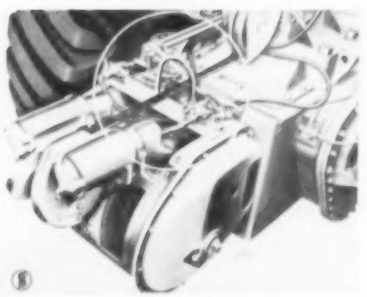

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Frayed cable is often the result of a bent or misaligned sheave, or a sheave or ejector roller that is binding or not turning freely. Sheaves and rollers require lubrication to keep them rotating freely so that the cable does not slide on the sheave.

After installing new cable on a scraper, there should be approximately two wraps of ejector-apron cable on the cable control drum when the scraper ejector is at the extreme rear position with apron down. With the bowl at ground level, there also should be five to six wraps of cable on the drum. Where a drum is used to control a bulldozer, allow sufficient cable for at least four wraps around the drum when the blade is at ground level. When lowering the scraper bowl to the ground or when setting the cutting edge for digging, do it with a positive action keeping the cable under tension.

The ejector normally will move the material out of the scraper rapidly. However, the cable should not be overstressed when moving sticky gumbo material; normally some dirt "hangs up" on the cutting edge when unloading the scraper. The ejector can't go far enough forward to push it off. After unloading the scraper, let the ejector back by keeping the cable under tension. As the apron is forced upward by the dozing action of the dirt when the bowl is being filled, slack should be taken up in the cable and then let out enough to adjust the position of the apron. The cable control brake should be kept engaged while moving to the dumping area and to the cut, to keep cable from "free spooling."

From top to bottom: (A) Bowl master cylinder, located on the gooseneck near the upper nest of bowl lift sheaves, actuates a slave cylinder, and forces cable control lever to hold position when bowl approaches limit of travel; (B) slave cylinders, located on top of cable control housing, are actuated by master cylinders and force cable control lever to the hold position when ejector and bowl approach limits of travel; (C) ejector master cylinder, located at the forward end of ejector track, actuates a slave cylinder, and forces the cable control lever to hold position when the ejector approaches limit of travel

Depressed Pocket Over Grizzly

MOST GRIZZLIES over truck or railroad receiving hoppers are built flush with the surrounding area. The grizzly shown, however, is depressed about 3 ft. below the tracks so that a train load of material can be dumped and the material does not pile up on it to impede operations. Any trash or foreign material is thrown out of the opening by the attendant, and any large gravel is hand-sledged through the openings of the grizzly.

Grizzly placed 3 ft. below tracks to prevent pile up of material

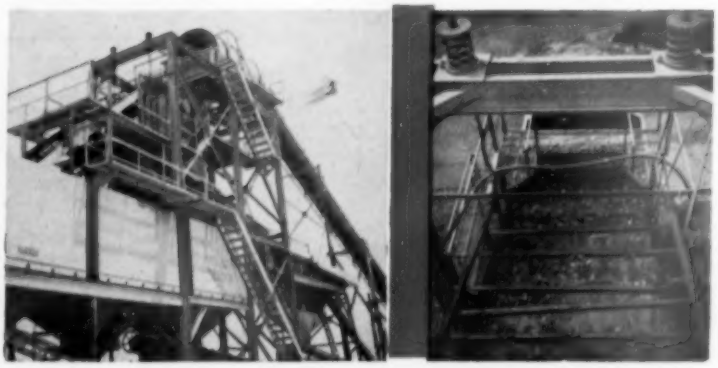
3,000 TONS OF

handled by a SIMPLICITY grizzly feeder at Badger Materials in Indiana

On the Indiana Turnpike, Badger Materials Co. is using a Simplicity Grizzly Feeder to handle 3,000 tons of aggregate a day, some of it well over 16 inches in diameter. This same material is being accurately sized by a Simplicity Simpli-Flo two bearing screen. A smooth operation throughout.

Start of the operation is shown here as a seven-yard truck dumps aggregate into a 25-yard receiving hopper. Feeding from this hopper is a Simplicity 3′ x 10′ OA-10-A2 Grizzly Feeder. The stone is fed off the grizzly bars and into a large gyratory crusher. The undersized material passes easily through the bars and onto a belt running under the crusher (the belt also receives crushed stone from the crusher). From here the material is fed into a plant which acts as a secondary crusher.

The material then travels up another belt, goes through a washer, and is discharged . . . onto a Simplicity 4′ x 12″ Simpli-Flo, 3-deck screen. Further washing is accomplished by spray bars on the Simpli-Flo, which is suspended by overhead springs and cables. The various sizes of material are dropped into hoppers and hauled away by trucks. Sand and undersized are sluiced off for separation.



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AGGREGATE A DAY

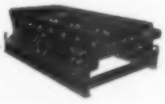
Simplicity Simpli-Flo Screens are two-bearing screens, generally hung by springs and cables from overhead supports. Simpli-Flo screens omit the usual main frame and outboard bearings, thereby offering minimum width for installations where width is a problem. On these double-end drive screens, the eccentric shaft is counter-balanced for efficient true circle operation; bearings are heavy duty eccentric type, protected against dust and water by labyrinth seals; discharge lips are readily accessible; and screen cloth is arranged for easy changing.

The Simplicity Grizzly Feeder combines scalping and feeding in one operation. This unit eliminates the old type arrangement of apron feeder and stationary grizzly. You will gain additional plant room. Your operating and maintenance costs will be cut by 50%. Simplicity Grizzly Feeders use an inertia type drive mechanism, and can produce heavy action, allowing sizes up to 6′ x 20′ and capacities up to 1,000 tons per hour. They maintain positive and controlled feed rates under the bin . . . bridging of material in the hopper is eliminated.

OTHER SIMPLICITY PRODUCTS INCLUDE:

- **Os-A-Veyor Feeders**

- **Simplicity Gyrating Horizontal Screens**



- **Simplicity 32 Series Balanced Conventional Pan Type Vibrating Conveyors**

- **Simplicity Woven Wire Screens . . . Send for Catalog No. 66**

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.

FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario

FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 13, MICHIGAN

For Lower Costs on
SPECIFY GM
In ALL Your

PRODUCTION DOUBLED—FUEL COSTS CUT 33⅓%

When Clark & Sons Sand & Gravel Company switched to a GM 2-cycle Detroit Diesel properly engineered for this dredge, production jumped more than 200% and fuel costs dropped one third. GM Detroit Diesel weighs half as much as engine it replaced, starts easier, too.

FUEL COSTS $1.18 PER HOUR

And that's "mighty cheap" for a 360-H.P. engine according to Charles Bartelma, Superintendent of Minnesota's Kimmes Construction Company. This GM Detroit Diesel-powered Cedarapids crusher produces 4,200 tons of gravel a day—engine has had no repairs in 2½ years.

PRODUCTION UP 30%—FUEL COSTS CUT 40%

When Calumet Paving Company switched to a GM Detroit Diesel on this paver they got an engine that "starts easier, performs better, costs less for fuel and maintenance." Company also operates two other pavers and three crawlers—all GM Detroit Diesel-powered.

15 YEARS' SERVICE AND STILL GOING STRONG

The GM Detroit Diesel in this Koehring shovel went to work for Paul Frank, Inc., in 1941—is still giving "economical, trouble-free service." Owner calls engine an "excellent investment, considering low first cost, operating economy and long life between overhauls."

OPERATES 20 GM DETROIT DIESELS

Ohio road-builder A. J. Baltes, Inc., operates 20 GM Detroit Diesel engines powering shovels, cranes, draglines and other equipment. Company specifies GM Detroit Diesel power when ordering new equipment—also replaces other engines with GM Detroit Diesels to get "the fundamentals needed for economical operation—performance, economy and service availability."

Every Contract

DETROIT DIESEL POWER

Construction Equipment

YOU CAN HANDLE every construction job from first cut to final paving—and handle it at less cost—with General Motors Detroit Diesel-powered equipment.

Shovels, scrapers, compressors, graders—machinery for over 1,000 applications made by more than 150 manufacturers—are powered with GM Detroit Diesel engines, *America's first choice Diesel.*

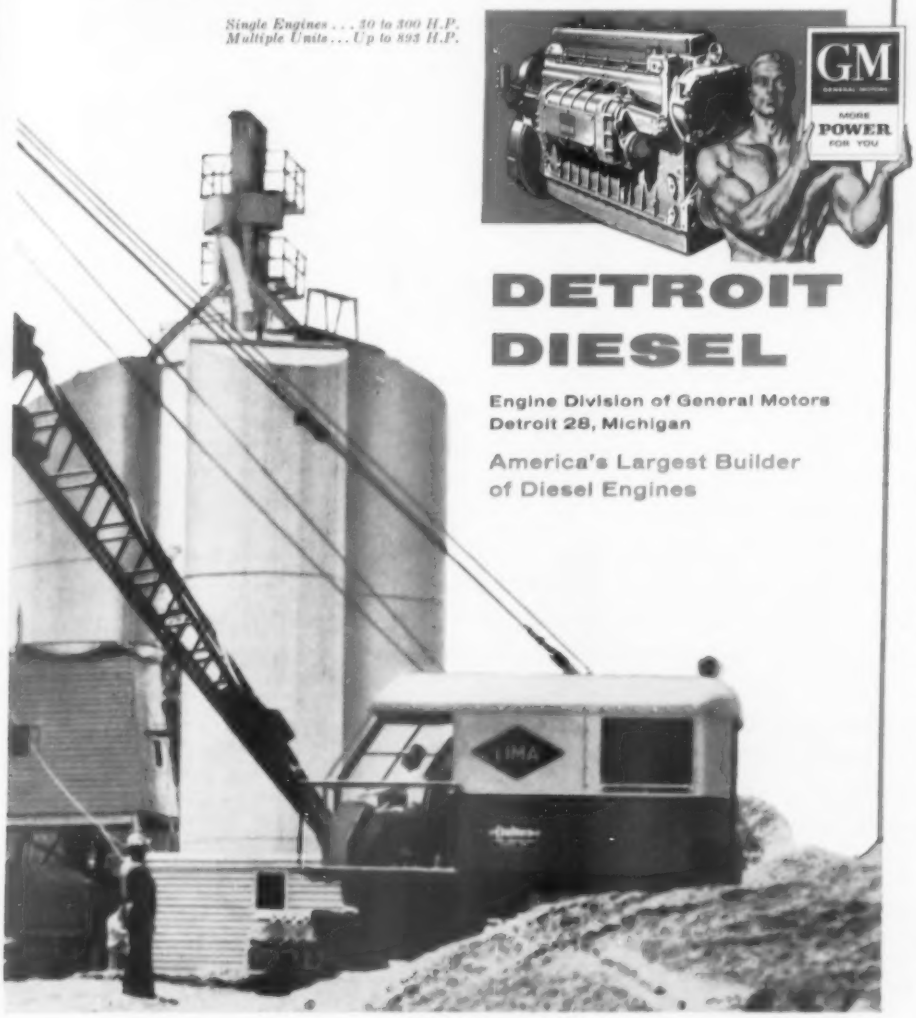
This compact, brawny work horse costs less to buy than other Diesels of comparable horsepower.

It costs less to run because its snappy 2-cycle operation gives faster acceleration, faster digging and hauling, more work done per shift.

And it costs less to maintain, too. Parts cost less. Valves, cylinder liners cost less than similar parts for other Diesels.

For full details on GM Detroit Diesels—and the equipment they power—call in your local GM Detroit Diesel distributor or write direct.

Single Engines . . . 40 to 300 H.P.
Multiple Units . . . Up to 893 H.P.



DETROIT DIESEL

Engine Division of General Motors
Detroit 28, Michigan

America's Largest Builder of Diesel Engines

Parts and Service

When and Where You Need 'em

Back of GM Detroit Diesel performance stands a national network of 165 GM Detroit Diesel distributors and dealers.

They're ready to supply you with factory-engineered parts *where* and *when* you need them.

They're ready to send factory-trained servicemen speeding to your job day or night—men with all the skill and know-how it takes to keep your GM Detroit Diesels running right.

And they're ready to fill your every power need whatever it is—from a complete new engine to a minor replacement part.

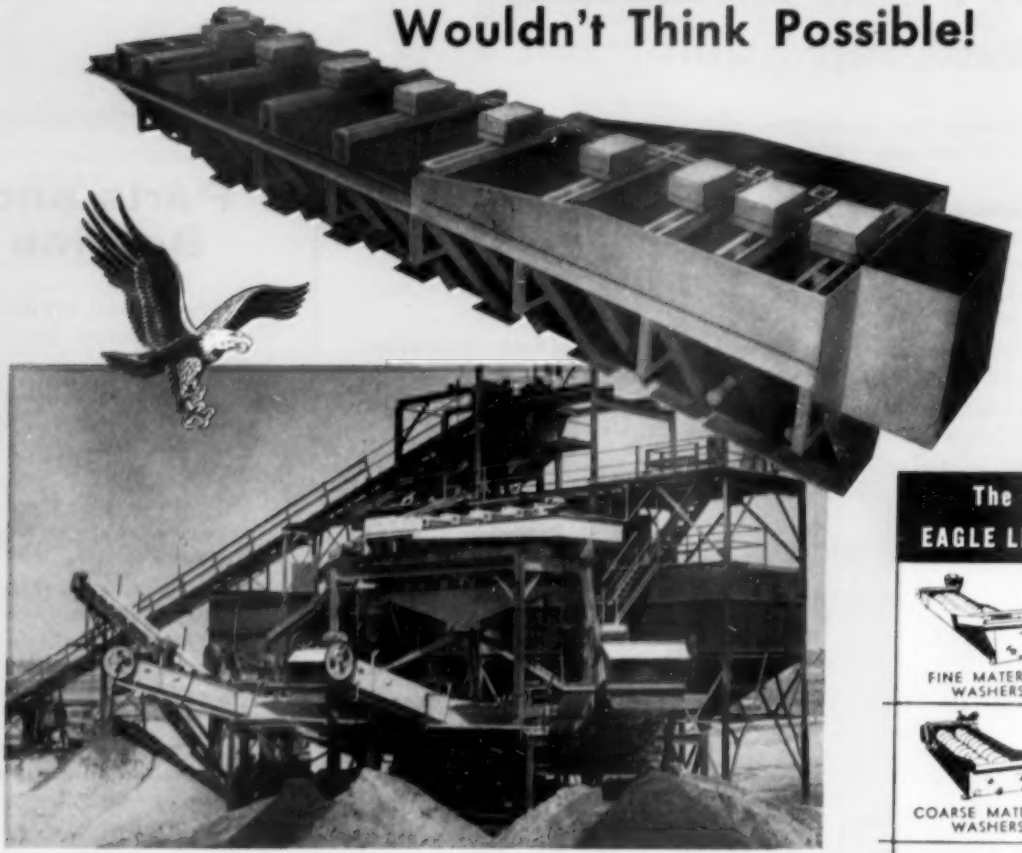
When you get replacement parts from your GM Detroit Diesel distributor or dealer you're getting *factory-engineered* parts built to the same high quality standards—by the same precision methods—as the parts used in building GM Detroit Diesel engines.

You get parts with every improvement advanced engineering has developed because *only* GM Detroit Diesel parts have *all* the improvements originated by GM engineers at Detroit Diesel.

And you get longer-wearing parts that have been proved in billions of hours of service on the toughest jobs.

For full details on the parts and service behind GM Detroit Diesel performance, call in your local GM Detroit Diesel distributor or dealer. He's listed in the Yellow Pages—or write direct for the name of the distributor nearest you.

The EAGLE Water Scalping-Classifying Tank Gives You Classification You Wouldn't Think Possible!



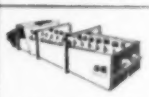
THE EAGLE Complete Washing-Classifying-Dehydrating Section at the eastern aggregate plant shown, has a 24′ tank equipped with 9 automatic, power-operated bleeder valves. Pit run sand is segregated into 9 distinct classifications, each flowing from one of the 9 valves. "Splitter" gates below each valve, in conjunction with the Multi-Cell Collecting-Blending Flume below the tank, permit directing of any percentage from each valve to any of the three Eagle Screw Washer-Classifier-Dehydrators. Or, any percentage from any valve can be wasted. Complete flexibility to produce any gradation—or variety of gradations—material to meet specifications.

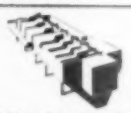
You can increase the efficiency of your present Eagle Fine Material Washer or Washers—or other make—by installing an Eagle Water Scalping-Classifying Tank—whether yours is a dry pit operation, as shown, or a pumping operation. Send for the facts in Catalog 55.

The EAGLE LINE

FINE MATERIAL WASHERS

COARSE MATERIAL WASHERS


LOG WASHERS


WATER SCALPING—CLASSIFYING TANKS.

"SWINTEK" DREDGE LADDERS

COMPLETE DREDGES

BREAKER BALLS & PILE HAMMERS.

EXPERIENCE, PROGRESS, SERVICE SINCE 1872

EAGLE IRON WORKS

137 HOLCOMB AVE., DES MOINES, IOWA

NEW MACHINERY

Telescopic Hoists

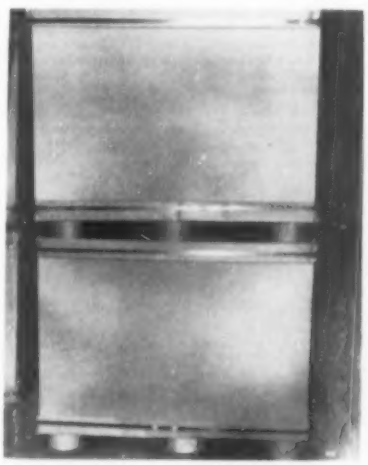
GALION ALLSTEEL BODY CO., Galion, Ohio, has announced a line of front mounted single telescopic hoists for use with 8- to 15-ft. bodies. Known as the Uni-scopic series, the hoists are said to have a greater lifting capacity, yet weigh less than underbody hoists. Most of the hoist weight is moved to the front axle and, because the hoists lift at the front of the body, greater payloads can be shifted forward to load the front axle to its legal limit. Payload capacities range from 3 to 14 cu. yd. and 9 to 20 tons. The hoist cylinders are three stage with 5- or 6-in. first stage sleeves, depending on hoist capacity. The pump is a high capacity roller bearing type, to meet large oil volume requirements of telescopic hoists. A three-position spool-type control valve is built into the pump.

Vibrating Screen

HEWITT-ROBINS, INC., Stamford, Conn., has developed a high speed vibrating screen, the "HS Vibrex," for fine screening of such materials as sand, clay, fertilizers, chemicals, asbestos, etc. The screen has a speed of 3300 r.p.m. when set for a $\frac{1}{32}$-in. stroke and 2400 r.p.m. when operating on a $\frac{1}{16}$-in. stroke. A lubricating technique is featured, utilizing the injection of atomized oil under pressure into bearings in the form of a fine airborne mist. This prevents the overheating of bearings formerly encountered at high speeds. The screen is designed for use with screen cloth of 10 to 80 openings per lineal inch, and, under certain conditions, is suitable for separations as high as 100 mesh. Wet or dry materials can be screened, and the unit is designed for applications requiring electrically heated screen cloth to prevent blinding of cloth openings by damp materials. The screen handles most materials at an inclination from 10 to 15 deg.

Portable Rotary Compressor

WORTHINGTON CORP., Portable Compressor and Contractors' Tool Div., Harrison, N. J., has announced the addition of a 210 c.f.m. portable rotary compressor, as part of a line of modernized Blue Brute compressors which include the 125, 210, 315, and 600 c.f.m. sizes. The 210 c.f.m. compressor incorporates the same basic features as the company's other units, such as: a newly designed clutch, and separate oil reservoir equipped with a pre-heater for cold weather starting. General maintenance and inspection of parts is simplified by accessibility features, and a gravity-draining design of the cylinders prevents "lock" and the danger of oil accumulation.



Unit Loading Method

UNIVERSAL PAPER BAG CO., New Hope, Penn., is utilizing a shipping package known as the "Drumpak," which was developed in cooperation with Gaylord Container Corp. Formerly bags were stacked in shingles of 10 or 20 wooden pallets and covered with paper and strapping, but chafling, wrinkling or in some cases tearing was encountered. The corrugated Drumpak heavy-duty container completely encloses the bags. First step in packing is to place the bags in interweaving patterns on the bottom cap of the container; when the pile reaches about 3 ft., the body is slipped over and bags added so that they finally project 15 in. above the box body. The filled box is then moved under a hydraulic compressor which tightly compresses the bags. The top and bottom lids are held firmly in position by steel strapping inserted in pre-cut "ears."

Cable Dump Trailers

HOBBS TRAILERS of Fort Worth, Texas, a division of Fruehauf Trailer Co., Detroit, Mich., recently supplied 26 Hobbs Schonrock cable dump trailers for the $12,800,000 Tiber Dam project, located on the Marias River near Chester, Mont. Guy H. James Construction of Oklahoma City, Okla., and Wunderlich Contracting Co., Omaha, Nebr., had to transport large-size stone from a granite mountain nearly 40 miles from the dam site to be used to line the foot of the spillway of the dam to prevent erosion and to face the dam and a portion of the dike.

The trailers feature a cable-dump principle, consisting of a winch working with a cable and sheave assembly that pulls the rear wheels toward the truck, thus raising the trailer on lifting arms into dumping position.

Hydraulic Truck Loader

LODAL, INC., Norway, Mich., has brought out a hydraulic truck loader with a 3000-lb. capacity. Designated the "LoDal," it fits most trucks from

Clark Equipment offers a practical this Vital Area:

TRANSMITTING

These Men Are Your "Contacts" With CLARK —— concerning design problems and service

HARRY B. STONE

Clark Equipment Company
Buchanan, Mich.

Mr. Stone, Supervisor of Distributor Sales for Clark Equipment, is an engineer and sales executive of 19 years experience with leading automotive equipment builders.

RENKE BRUNKEN

Brunken Corp.,
710 Knollwood Avenue, Ashtabula, O.

Renke Brunken handles Clark automotive line from Maine through the Carolinas, Penna., eastern Ohio. Eminent engineer, Torcon founder, Mr. Brunken is a power-transmission authority.

NICHOLAS A. D'ARCY, JR.

Nicholas A. D'Arcy, Jr.,
7535 Marbrisa St., P. O. Box 447,
Huntington Park, Calif.

Clark automotive products sales in California, Arizona and Nevada are handled by Mr. D'Arcy, long experienced in heavy equipment, a mechanical engineer.

WADE A. ESKRIDGE

Wade A. Eskridge,
403 S. Peoria St., Tulsa, Okla.

Southwest District Supervisor and outstanding automotive engineer, Mr. Eskridge heads the Clark field office in Tulsa, a complete facility for technical aid, prompt service and parts inventories.

HARLAN C. McKAY

Harlan C. McKay Company
2950 S. W. Vista Drive, Portland 1, Ore.

The McKay company sells and services the Clark automotive line in the Pacific Northwest, Br. Columbia, Alberta and Alaska. Mr. McKay knows power needs of logging, contracting, transportation.

MAX RICHLER

Richler Automotive Corporation,
836 Wellington Street, Montreal 3, Quebec

Max Richler and his brothers, old-established equipment house, sell Clark's automotive line in Ontario, Quebec; with service facilities and parts at Montreal and Toronto.

comprehensive service covering

ENGINE TORQUE

H. A. DAVIS

H. A. Davis Power Equip. Co.,
2142 Irving Boulevard, Dallas, Texas

In Texas, Clark's automotive line is handled by H. A. Davis Power Equipment Co., leading distributor, with complete sales, service and parts inventories.

JOHN M. SHANK

John M. Shank Co.,
5 Birchwood Ave.,
White Bear Lake 10, Minn.

Mr. Shank, power equipment veteran, distributes Clark automotive products in Minn., Wis., N. and S. Dakota, Iowa, Nebr., Upper Mich.; and maintains complete service facilities.

For more than half a century, Clark Equipment has focused its engineering attention on a Vital Area of machinery performance —the Transmission of Engine Torque.

From that planned specialization came Clark axles, Clark transmissions and the Clark one-piece forged axle housing; and finally, as a natural evolution, the Clark torque converter.

Better Power-Trains=Better Machines

When the first Clark fork-lift truck was born in 1927, Clark applied its know-how and torque transmission experience to developing power-train systems for this new type of vehicle.

Again, in recent years, Clark developed a revolutionary power-train for its own newly developed tractor shovel; and almost overnight became a major factor in the construction machinery industry.

What could be more natural than that other manufacturers of agricultural and industrial machinery, recognizing Clark's unique asset of power transmission experience and expertness, should ask for Clark collaboration in developing driving units of functional design for their own products?—ask for it, and get it.

So today it can be said of many modern machines, Clark-built and others: "From engine flywheel to point of power use—torque transmission system designed and manufactured by Clark Equipment."

NOW: A Service to Users

Today that invincibly logical Clark development has an equally logical sequel: a complete Power Transmission Service to users of diesel or gasoline horsepower—from flywheel to point of torque application.

That service is implemented as follows:

- **District Sales Engineers—A nation-wide organization of men fully qualified to help solve technical problems**
- **Independent Equipment Dealers—Long established businesses of high reputation and well staffed; to distribute Clark products direct to users in certain key industries**
- **Adequate Service Facilities—With service parts stocks maintained at strategic points, to provide prompt, accurate satisfaction for users' needs**

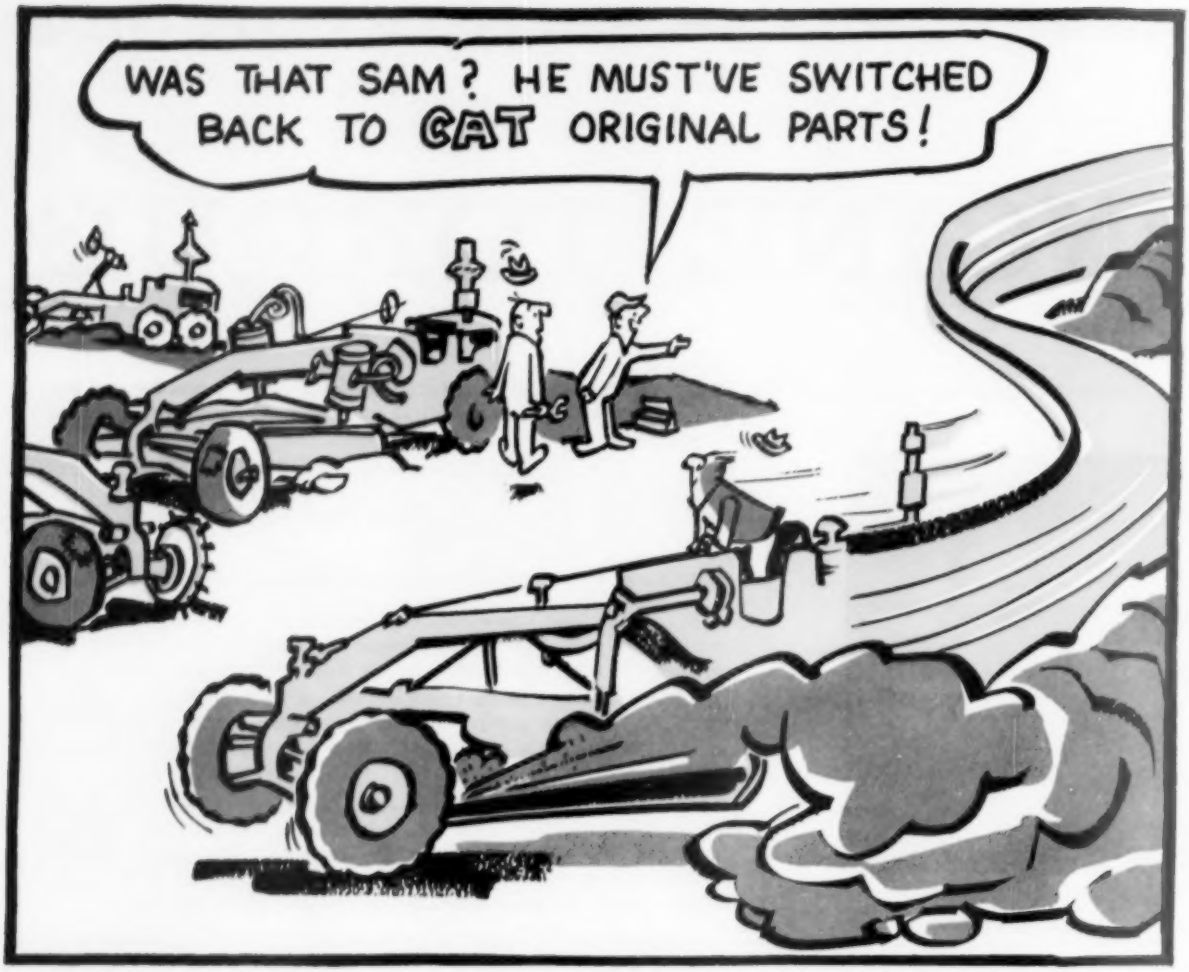
As a user of diesel or gasoline horsepower, always on the lookout to get the best possible performance at lowest possible costs, you'll find it good business to establish a working relationship with Clark, through its nearest representative.

CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
Automotive Division

Transmissions, Torque Converters: Jackson 10, Michigan

Axles: Buchanan 10, Michigan



Take it from Sam. Beware of "just as good" substitutes.

A cutting edge for your CAT* Motor Grader, for example. Caterpillar original cutting edges are made from only top-quality high-carbon steel—carefully pretested. Or scarifiers. If they're Caterpillar, the shanks are strong steel forgings mounted in a heavy cast steel block. Their replaceable teeth of forged alloy steel are selectively heat treated to resist wear.

You're sure of more dependable performance on any kind of job when you use only Cat cutting edges and scarifier teeth.

With substitute parts, can you be sure of anything?

See your dealer's Parts Representative—better get Caterpillar original parts every time.

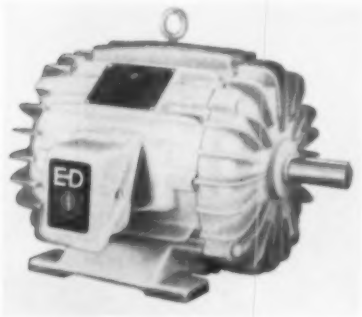
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Cat original motor grader cutting edges and scarifier teeth are the results of never-ending metallurgical research. They match the all-around performance of the quality machines they work with.

CATERPILLAR*

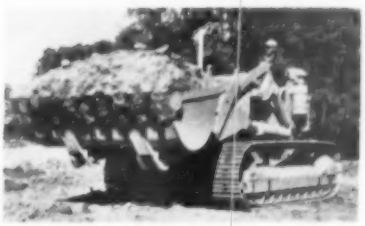
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

1½ to 4 tons capacity, with special models for trucks over 4 tons. The truck loads itself and in addition, the forward tilting bucket provides for loading other trucks.



Totally Enclosed Motors

GENERAL DYNAMICS CORP., Electro Dynamic Div., Bayonne, N. J., has brought out an improved totally enclosed, non-ventilated and totally enclosed fan-cooled motor conforming to the dimensional standards recently adopted by N.E.M.A. The complete housing and end brackets are constructed of solid cast iron, ribbed frame. The motor, designated type "H," is designed for operation where non-combustible dust and moisture are prevalent. Motors are available with 182, 184, 213, 215, 254U and 256U frames, as well as larger sizes. Previous design N.E.M.A. frames 203 through 505 totally enclosed, fan cooled, are also available.



Large Tractor-Shovel

CATERPILLAR TRACTOR CO., Peoria, Ill., has announced the No. 977 Traxcavator, the largest in its line of tractor-shovels. It incorporates features of the No. 933 and No. 955 units, such as: 40-deg. bucket tip back at ground level; good horsepower-to-weight ratio; advanced hydraulic system; large lifting capacity; improved operator convenience and visibility; in-seat starting; and oil flywheel clutch.

The 2¼-cu. yd. bucket can be alternately tipped and leveled while pushing to help work its way into the material, and heaped loads can be obtained at the ground line. The tip-back action also improves stability since the center of gravity of the loaded bucket moves back toward the tractor as the bucket is tipped back. The ability to carry the load in a low position keeps the center of gravity closer to the tractor.

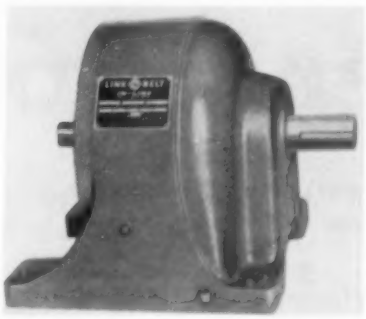
Long track roller frames provide stability and low ground pressures, while three-bar grouser track shoes supply ample traction for shovel usage. Overall dimensions of the 100-hp. Traxcavator are: 17 ft. ½ in. long; 8 ft. wide; 7 ft. 3¾ in. high; and 1 ft. 4½ in. ground clearance.

Arc Welding Electrode

HOBART BROTHERS CO., Troy, Ohio, has introduced "Rocket LH," an improved type of low hydrogen arc welding electrode. It can be used for welding in all positions, and the incorporation of iron powder and a special formula is said to provide a greater deposited weld metal with a smooth, uniform bead. Porosity resulting from starting and restarting the arc is also said to be eliminated through the addition of iron powder. The electrode is packaged in hermetically sealed metal cans and has a natural resistance to moisture for at least ten days after the can is opened.

Improve Bearing Lubrication

SKF INDUSTRIES, INC., Philadelphia, Penn., has announced the addition of lubricating holes in the outer ring of its spherical roller bearings 240 mm. O.D. and larger. The design change provides for more efficient "center" rather than "side" lubrication of a bearing. In addition, the flow-path prevents the entry of dirt into the bearing and helps the lubricant to reach all working surfaces.



Helical Gear Drives

LINK-BELT CO., 307 N. Michigan Ave., Chicago, Ill., has developed several in-line helical gear drives with one-piece cast iron housings, and oil seals at shaft openings. Double reduction drives are available in ratios from 6.2 to 1 through 38.4 to 1, with capacities up to 118 hp. Triple reduction drives are available in ratios from 47.1 to 1 through 292 to 1, with capacities up to 20 hp. Space requirements and layout problems are minimized by locating input and output shafts in the same horizontal and vertical planes. Precision gearing is featured, and all moving parts are splash-lubricated and permanently aligned for minimum maintenance.

Lift Truck

HYSTER CO., 2902 N. E. Clackamas St., Portland 8, Ore., has announced the HC-50 lift truck, weighing 5000 lb. and with an outside turning radius of 79 in. Its features include low center of gravity and a comparatively long wheelbase. It is powered by a Waukesha gasoline engine. Diesel engine LP gas conversion kit, Hystamatic drive and Hyster Free Lift are optional features.

Frameless Dump Trailer

ANTHONY CO., Streator, Ill., has announced the Teleramic frameless dump trailer, featuring a single hydraulic telescopic cylinder mounted on the tractor fifth wheel coupling, which lifts the entire front end of the trailer when dumping a load. In raising or lowering, the trailer body pivots around the rear wheels, and during this cycle, tubular stabilizer arms, pinned both to the hoist-fifth wheel and the trailer body, give added support for a variety of loads and working conditions. Additional legal payloads up to 2000 lb. can be hauled, since the elimination of the conven-

Bigger Capacity...

This new, 1956 model HO "PAYLOADER" has a bucket capacity of 2¼ cu. yd. payload, 1¾ cu. yd. struck . . . is the biggest-capacity "PAYLOADER" ever offered, and outstanding by any measure. Pound for pound, it's ahead of the field in digging power and carrying capacity. It's more maneuverable, faster operating, easier operating, easier riding—with or without a load—than anything near its size. It delivers better, more reliable traction over a wider range of ground conditions than any wheeled tractor-shovel *ever* has. It has balanced design and durability *throughout* to deliver big yardage day after day without interruption.

HOUGH Design . . Quality . . Value

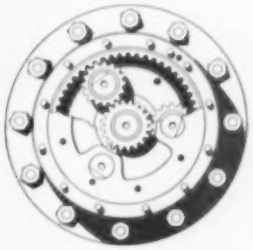
Digging power: Pound for pound, this "PAYLOADER" has more traction and digging power—for a wider range of ground conditions—than any wheeled tractor-shovel ever built.

Hydraulic shock absorber: A shock absorber in the hydraulic system smooths out the ride, permits faster load-carrying speeds over rough terrain—with less spillage.

More production, less effort: Power-steer, power brakes (on all 4 wheels), power shift (no "clutching") and good riding qualities also lessen operator fatigue—promote full production all day.

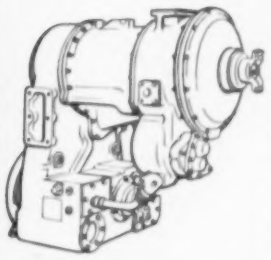
"Stay-clean" hydraulic system: The hydraulic system is closed and pressure-controlled to keep air and dirt from being sucked into the system. This reduces oil foaming, lessens trouble and increases the life of pump, valves, cylinders, rod packings. Both boom and bucket rams are located so as to minimize their exposure to dirt and damage.

Accessible: Unusual accessibility for servicing and maintenance is built into this "PAYLOADER." Battery and oil reservoir are located under an easy-access cover just behind driver's seat. Easy access to engine is possible from either side—and not hindered by boom arms or other structure. "Pick-off" outlet is provided for the easy addition of hydraulically-operated accessories.



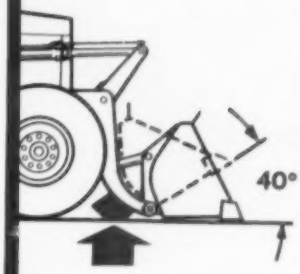
Long-life, high-traction drive train

Heavy duty planetary final drives in the wheel hubs, and hypoid differential gearing, keep torque low in axles . . . prolong life of axles and *all* drive train parts. More effective traction is assured by the use of the model HO torque-proportioning differentials. If one wheel starts to slip, more power is delivered to the opposite wheel. The wheel with the better traction automatically gets up to 24% more torque.



Complete power-shift transmission

The easiest-acting, most effective transmission ever built into a tractor-shovel. *All Shifts* up or down can be made instantly, on-the-go under full engine speed. There's no foot clutch, no stopping for a RANGE shift. The forward-reverse control can also be operated under full engine speed, in any gear, while retaining full bucket action . . . all this, plus torque-converter drive.



Tremendous pry-out action and 40° tip-back at ground level

Special pads are provided on the bottom of the boom arms to give ground support for powerful pry-out action. Load forces are also absorbed by the pads, relieving the axles and wheels of these strains. The bucket can tip back 40 degrees, before raising, to get heaped loads quick and easy even in shallow cuts and low piles, and to retain heaped loads.

Better Performance

If you want the last word in tractor-shovel workability on your jobs, you'll want this husky HO "PAYLOADER". Your Hough Distributor is ready to give you full information.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
705 Sunnyside Ave., Libertyville, Ill.

Send full information on "PAYLOADER" 4-wheel-drive tractor-shovels

☐ model HO—2¼ cu. yd. ☐ model HH—1½ cu. yd. ☐ model HU—1 cu. yd.

Name_____

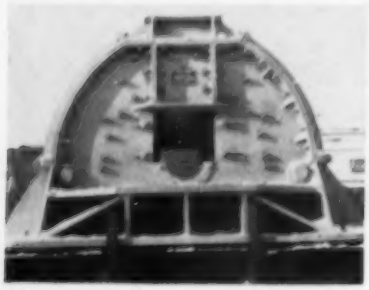
Title_____

Company_____

Street_____

City_____ State_____

tional trailer frame and the use of only one front mounted head lift telescopic cylinder provides a weight saving.



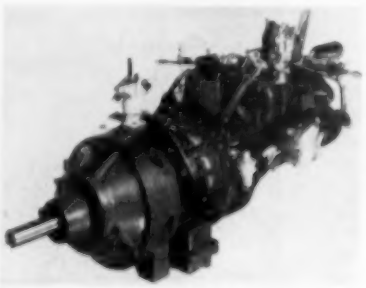
Reversible Impact Crusher

POOR & CO., Crusher Engineering Div., Philadelphia, Penn., has brought out the Hy-Ton reversible impact crusher which features synchronized adjustment of upper and lower concentric breaker blocks to attain maximum control of product size and long life of wearing parts. A hydraulic method of adjusting, removing and replacing bearings provides ease of maintenance. Heavy internal flywheel end discs are utilized for safe operation and decreased power consumption. The unit is designed to produce tonnages of a uniform size cubical product with production rates up to 700 t.p.h.

Underground Earthmover

KENWORTH MOTOR TRUCK CO., Seattle, Wash., working in cooperation with the engineering departments of General Electric Co., Schenectady, N.Y., and the Riverside Cement Co., Riverside, Calif., developed an electrically-powered earthmover truck for underground hauling. Known as the 802-E, it is powered by electric traction motors, receiving current from overhead wires through a trolley. The truck also is equipped with a cable reel so the operator can maneuver away from the overhead wire zone. Motive and control electrical equipment for the 802-E is manufactured by General Electric's Locomotive and Car Equipment Dept. The Riverside Cement Co. is utilizing the trucks at its Crestmore, Calif., limestone mine, to haul limestone from the underground mine to a crusher on the surface.

Capacity of the truck is 16 cu. yd. struck, or 24 tons. The heaped load capacity is 19 cu. yd., and gross vehicle weight rating is 93,000 lb. It has a fabricated steel frame with variable vertical sections and tubular cross members. Front axle capacity is 25,000 lb., and the full-floating drive axle is a double reduction type. First reduction is a spiral bevel drive unit, and final reduction is through planetary gears in each wheel. Power steering, two-step dynamic braking and rubber-mounted springs are among its other features. The wheelbase is 14 ft., overall length is 24 ft. 10 in. with an overall width of 11 ft. 6 in. and an overall height of 11 ft. 10 in. The one-man offset cab is enclosed and has access doors on both sides.



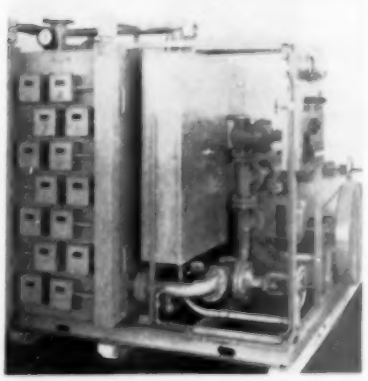
Torque Converter

CHRYSLER CORP., Industrial Engine Div., Detroit, Mich., has announced that its industrial torque converter, recently introduced, is adaptable to any type of equipment because it is factory equipped for transmission and power take-off. Coupling efficiency is handled automatically and when the torque demand falls off due to load diminishing, the converter enters coupling range where it is said to reach almost 97 percent efficiency. It is lightweight, constructed of cast aluminum alloy, and features dual cooling systems, both liquid and direct air, for more efficient heat dissipation. As optional equipment, an output shaft governor provides instant response to variations in road and load conditions. The torque converter provides a torque multiplication of 2.6. The illustration shows a 265-cu. in. displacement engine equipped with the dual-cooled industrial torque converter. Here the converter includes its own tailshaft governor and is installed with a right angle power take-off. It has its own self-contained oil sump and oil pressure system as part of its standard equipment.

Agstone Spreaders

BAUGHMAN MANUFACTURING CO., Jerseyville, Ill., has introduced the K-5 Series of agstone and fertilizer spreaders. A choice of three types of conveyors and three types of drives is available. Conveyors include a 20-in. wide drag chain conveyor with heavy-duty malleable block chains welded together with 4-in. spaced cross drags; a 12-in. wide chain belt conveyor with individual links which tend to break up small lumps, and eliminate endgate plugging; and a 20-in. wide belt conveyor with a double corrugated drum for steady belt pull.

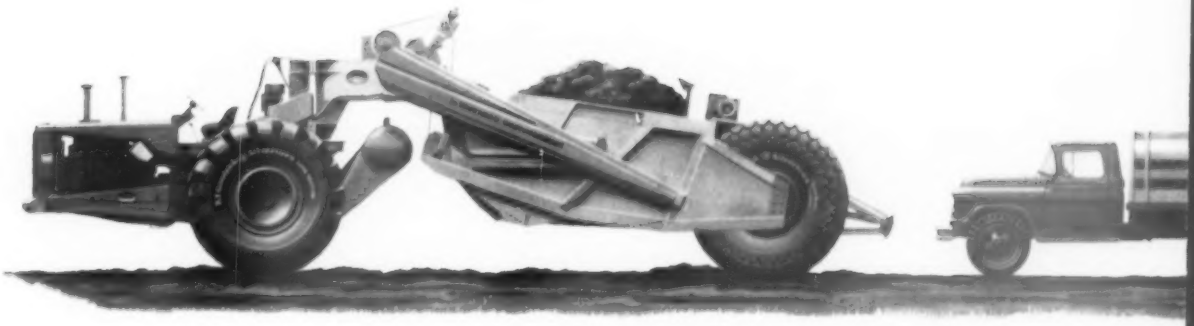
The body features a reinforced top edge of 2-in. square tubular steel to protect the body from denting by end loaders and shovels. Welded external jacks are incorporated for full-length reinforcement and body support. Welded internal bracing is also featured for full-load strength under all operating conditions.



Hot Oil Systems

PARKS-CRAMER CO., Fitchburg, Mass., has announced electrically heated automatic Merrill Process systems which produce oil temperatures within the range of 150 to 600 deg. F. at low pressure in a compact, completely assembled packaged unit. It is ready for immediate service when connected to the tanks or kettles to be heated and

B.F.Goodrich tires han

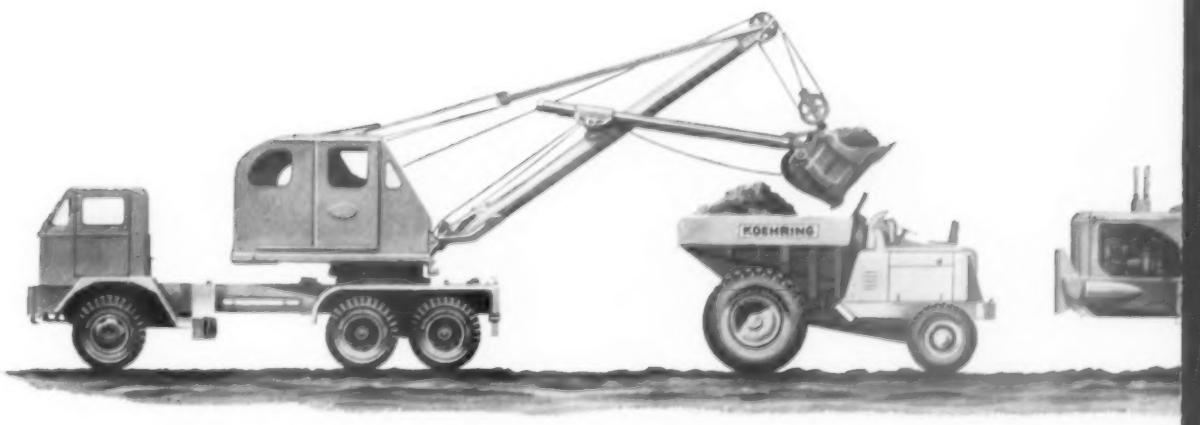


LeTourneau-Westinghouse Model B Tournapull and Model B Scraper measure 40′-6″, tower 12′-7″. Tournapull can make 90° left and right turns. Scraper holds 25 cubic yards heaped. Tires shown are B. F. Goodrich Super Traction on drive wheels and Earth Mover Traction on trailing wheels.

Chevrolet Task-Force stake truck Model 64 load of 13,300 pounds in a load space measur B. F. Goodrich All-Purpose tires are designe truck that does a variety of on and off-the-

This massive **Mack** LRVSW dumper is designed for mining, stripping and earth-moving projects. 30-ton payloads roll on such tires as the B. F. Goodrich Rock Logger and Universal. Diesel engine develops 400-h.p.

Oliver 4-wheel, open-top twin-cable scrapers in the 4C ser have a cutting blade up to 113″ long, can carry up to 1 cubic yards of dirt.

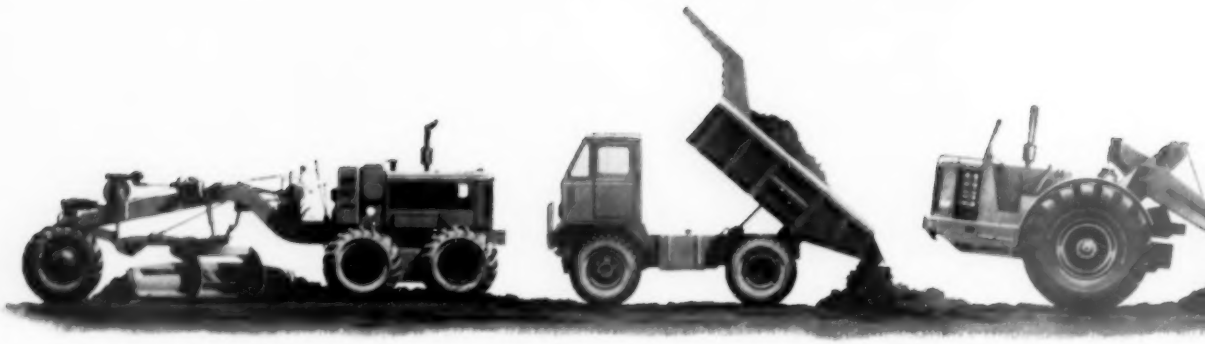


Michigan Model TMDT-16 is a general purpose 12½-ton excavator-crane fully convertible to all standard front end attachments. The boom is 17′-3″ long, has a diameter of 12¾″

Koehring Dumptor unloads 16,500-lb. payload in one second. No turns are necessary at shovel or dump because speeds are the same in forward or reverse.

← Lift Page

B.F.Goodrich Pa



The **Adams** No. 660 Diesel Motor Grader has 8 forward speeds up to 26 miles per hour, 4 reverse speeds up to 13.7 miles per hour. Unit rolls on 14.00-24 Tractor Grader Lug tires.

The body of this **Dart** Model 10-S truck rises to a height of 18 feet in dumping position, dumps at a 60-degree angle. Unit comes equipped with B. F. Goodrich Universal tires.

Double-Safety air brake ing, direct electric sta cable control are amo **Allis-Chalmers** TS-36

Caterpillar DW15 tractor with matched No. 15 scraper has 150-horsepower engine. Tires shown are B. F. Goodrich Ribbed Universal (front), Super Traction (drive), Earth Mover Traction (scraper).

Bay City CraneMobile may be used as crane, clamshell, dragline or pile driver. Maximum lifting capacity 25 tons. Will handle booms up to 110 feet plus 30-foot jibs.

These B. F. Goodrich tires ke

ALL-PURPOSE tires work on paved or dirt roads or in the rough on such jobs as logging, sand and gravel hauling, excavating, etc. *All-nylon* or rayon construction. Sizes 6.00-16 through 12.00-24.

UNIVERSAL tires are designed for power wheels on trucks and tractors that pull trailer equipment or for free-rolling wheels in severe service. *All-nylon* construction. Sizes 7.00-15 through 24.00-29.

TRACTOR GRADER tires deliver power to road graders, tractors and other equipment used in construction and road maintenance work. *All-nylon* or rayon construction. Sizes 9.00-24 to 18.00-26.

EARTH MOVER TRACTI tires are designed for free- ing wheels on scrapers, ea moving wagons and ot pulled equipment. *All-n* construction. Sizes 14.00-2 24.00-29.

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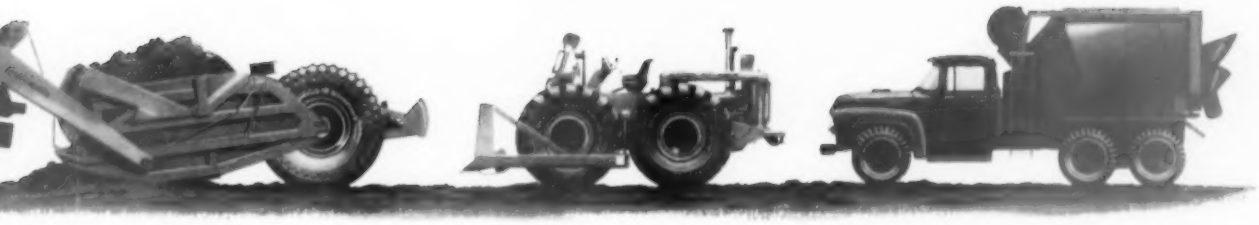
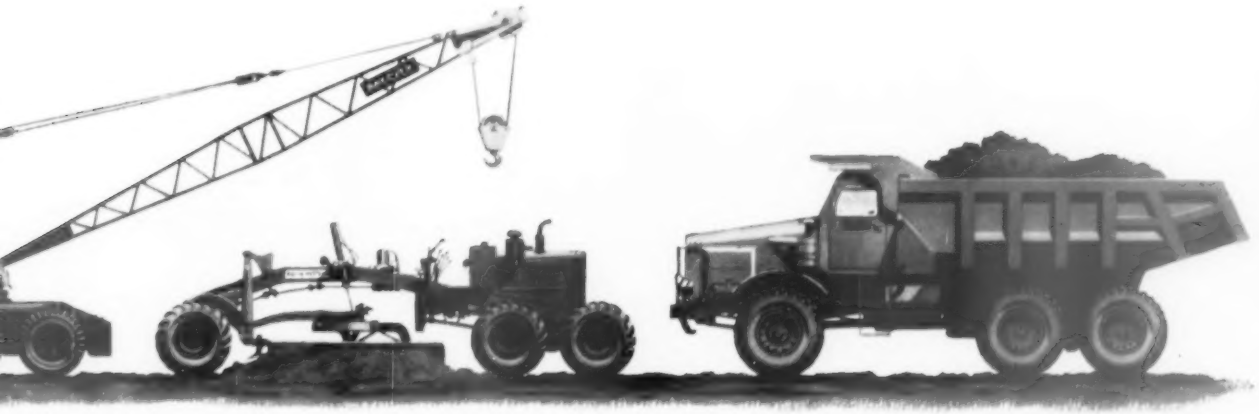


brakes, selective-speed steer-
c starting and multiple-disc
among the features of the
S-360 Motor Scraper.

Attachments for the **Le-Tourneau-Westinghouse** Model C Tournatractor include bulldozer (above), logging winch, tree stinger, scraper, V-type snow plow, root rake and angledozer.

Tubeless tires, power steering and tachometer are standard equipment on this **Ford** transit mix truck in the T-800 series. You have choice of 190-h.p. or 200-h.p. Y-block V-8 engine.



Austin-Western Super 99 Power Grader features 6-wheel drive and 6-wheel steering. Blade rotates 360° and raises 90° right or left. Tires are 13.00-24, 10 ply low pressure.

B. F. Goodrich Universal tires are shown on this **Euclid** Model FFD 34-ton rear-dump truck. Capacity is 28 cu. yds. heaped for payload weight of 68,000 lbs.

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SUPER TRACTION tires work in sand, loam and mud on drive wheels of large dirt-moving rigs. For free-rolling wheels in reversed position. *All-nylon* construction. Sizes 18.00-25 to 24.00-29.

ROCK LOGGER tires are built for drive and front wheels on dump and logging trucks, cement mix trucks, quarry and construction machinery. *All-nylon* construction. Sizes 8.25-20 to 14.00-24.

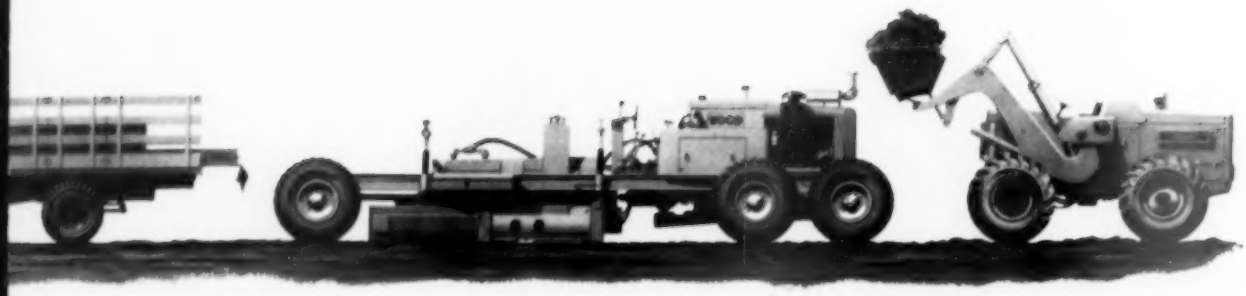
SPECIAL compounding for extra toughness, special tread designs for every kind of work, special *all-nylon* cord bodies that outwear even the extra-thick tread and can be recapped over and over—these are some of the advantages B. F. Goodrich builds into its off-the-road tires. If you want lower operating costs and longer, trouble-free tire service, see your B. F. Goodrich retailer today. On-the-job service is available coast to coast from B. F. Goodrich retailers. *The B. F. Goodrich Co., Tire & Equipment Div., Akron 18, Ohio.*

Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

B.F.Goodrich
FIRST IN RUBBER

Specify B. F. Goodrich tires when ordering new equipment

dle the big, tough jobs



9 carries a pay-
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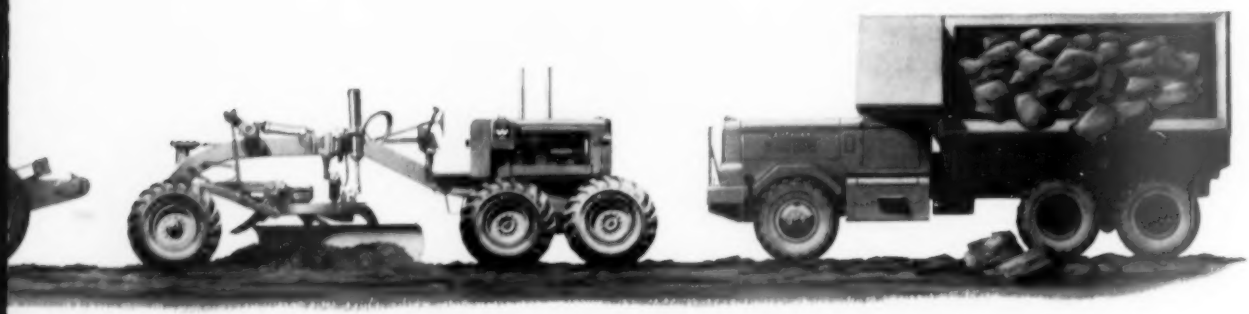
Up to ¾ of a mile of 24-foot roadway, 3" thick, can be produced by the **Pettibone Wood** Model 42 Roadmixer in an 8-hour day. This machine mixes cement or asphalt for highway, airport or parking area construction.

The bucket of this **Hough Payloader** raises to a maximum height of 16'-1" from a digging depth of 12" below the ground. Four-wheel drive, with 14.00-24 tires, provides maximum traction.



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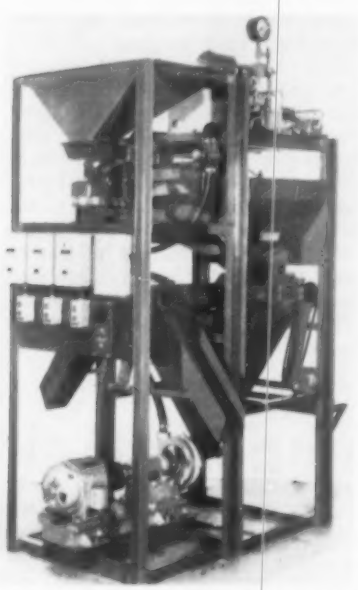
Grading, maintenance, snow removal, scarifying, bank sloping and ditching are just a few of the jobs for which **Huber-Warco** motor graders are designed.

Side-dumping **White** Autocar DC-10364S-OH carries a truck load of 12 cubic yards. Truck weighs nearly 22 tons, rolls on 10 B. F. Goodrich Rock Logger tires.

Haul-road speeds up to 24 mph, fully loaded, are a feature of the **International** Model 75 Paywagon. Tires are B. F. Goodrich Super Traction.

Thew Shovel's Lorain MC-524 Moto-Crane handles everything from loading logs to erecting steel.

the proper electrical connections are made. The illustration shows a 300,000 B.t.u. per hr. unit, but standard sizes range up to 2,800,000 B.t.u. and may be gas or oil fired. The approximate outside dimensions of the illustrated unit are 8 ft. 6 in. long, 6 ft. 6 in. wide and 6 ft. 6 in. high.

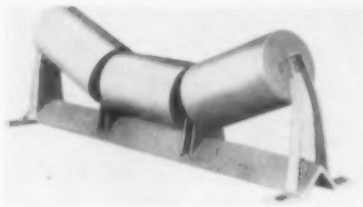


Laboratory Size H.M.S. Vessel

THE ORE & CHEMICAL CORP., 80 Broad St., New York, N. Y., has introduced a laboratory-size heavy media separatory vessel. The unit is furnished complete in steel framework as shown in the illustration, and is designed for batch-type testing. It can handle feeds to which the heavy media separation process is applicable in size ranges from minus 1 in. to plus 10 mesh. Although designed specifically for laboratory use, it is said to have the same simplicity and high ratio of productive pool area as are claimed for the commercial "OCC" heavy media vessel recently introduced by the company. The unit can handle feed capacities up to 1000 lb. per hr.

Scrapers

INTERNATIONAL HARVESTER CO., Chicago, Ill., has brought out the 1956 line of self-propelled, rubber-tired "Payscrapers." Two models currently available are the 262-hp. "75" and the 172-hp. "55." The model 75 capacity has been increased to 20 cu. yd. heaped and the model 55 to 14 cu. yd. heaped. Other changes are: straight-back bowl, similar to a dozer blade; lower draft frame; greater visibility; cerametallic clutch facing (on the model 75), which is made of a combination of powdered metals and ceramic materials similar to those used in jet airplane brakes; higher apron lift; bigger push block for positive contact with minimum effort; and an improved ejector.



Belt Conveyor Idler

LINK-BELT CO., Chicago, Ill., has introduced the Series 50 ball bearing belt conveyor idler, available in a greasable type, with a "one shot" lubrication system serving all three rolls at once, and a factory sealed type which requires no further lubrication. These idlers augment the line of idlers ranging from Series 90, through 50, 100, and 200, and includes idlers from light to heavy duty. Basically, the idler rolls consist of a smooth, uniformly thick outer shell plus a heavy-wall steel center tube. These tubes are brazed to dish-shaped steel heads, forming a moisture-tight, integral unit. The Series 50 idlers are available for seven belt widths from 14 in. to 36. in.

Portable Rotary Compressor

JOY MANUFACTURING CO., Pittsburgh 22, Penn., has announced a 600-ft. rotary portable compressor, the "Airvane." A Thermal By-Pass feature, heart of the temperature control system, is incorporated for uninterrupted performance. A controlled-velocity filter-separator with primary and secondary action removes oil from the compressed air. The rotary compressor features a weather-proof housing of high-strength steel. Low center of gravity and a short turning radius of 13 ft. are combined for maneuverability.

Portable Screening Plant

PIONEER ENGINEERING WORKS, INC., Minneapolis, Minn., has brought out the 512-VW portable sand and gravel washing and screening plant, especially designed to meet a variety of operating conditions and product requirements, particularly close to road-side production. Because of the varied field conditions and product specifications, the portable plant is offered with only the basic unit as standard equipment. Other units to fit the basic plant to local conditions and product demands are available as optional items. Two sizes and oversize of gravel and one size of washed sand are produced simultaneously, with a capacity of up to 340 t.p.h.

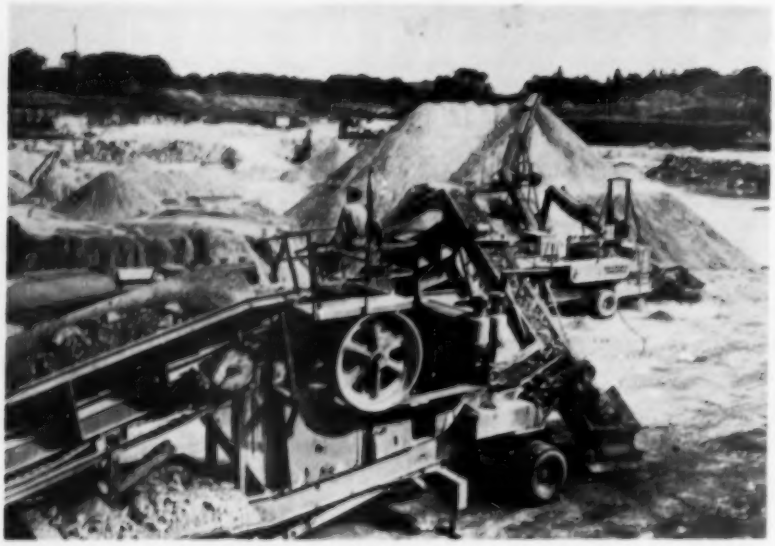
The standard basic unit consists of a 5- x 12-ft. three deck gradation screen, a 30-in. x 25-ft. double-screw fines material dewaterer, a 30-in. x 35-ft. on-the-plant feeder conveyor, and an 18-in. x 25 ft. and a 36-in. x 25-ft. side delivery conveyor. The side delivery conveyors may be attached on one side or both on either side.

Excavator

KOEHRING CO., Milwaukee, Wis., has announced a companion model excavator in the ¾-cu. yd. class, similar in basic design to the company's ½- and 1-cu. yd. machines. Designated the Model 305, it has a rated lift crane capacity of 25 tons on a truck chassis, 15 tons on a crawler mounting, and can be equipped with various attachments.

The upper machinery has been simplified to contain only two major horizontal shafts. The all-welded turntable is equipped with integral sidestands and main cross shafts revolve in anti-friction bearings. Self-cleaning crawlers, automatic traction brakes, and a mechanical cam type booster clutch on the main drum clutches are featured in the excavator.

The hoe attachment provides an increase in digging depth of 20 ft.



A typical midwest stone plant using portable units is the Frank N. Butler Co., Franklin Grove, Ill., producing 2000 tons per day

By BROR NORDBERG

Agronomists Speculate on Soil Bank

A POLL OF OPINION

. . . indicates a majority of the agronomists believe that proposed government program offers opportunities to increase sales volume

AS THIS ISSUE IS WRITTEN, Congress is considering the soil bank recommendations contained in the President's message on agriculture. The principle of the soil bank plan evidently has wide appeal since it sets up a specific program to reduce surpluses in farm commodities and to conserve land for future use.

It is expected that some form of soil bank program will be enacted by this Congress but apparently not soon enough to be instrumental to any great extent in 1956.

The soil bank plan as given in the President's message to Congress would combine a means to use up surpluses with means for reducing farm production. The principal crops to be affected would be wheat, corn, cotton and rice.

An acreage reserve plan and a conservation reserve feature comprise the program. The acreage reserve phase is a deferred production plan whereby the farmer would withhold certain acres of land in reserve to meet the immediate need to reduce the crops in greatest oversupply. He would be allocated certificates in payment, providing for the drawing from surplus government-owned storage of commodities in exchange for agreeing to cut back on his acreage.

He would plant soil building crops on diverted acres and thus "bank" fertility into the soil. Use of surplus crops in payment would cut down the need for large appropriations in payment, under the proposal, and payments would be set high enough to be profitable to the farmer.

The second phase, termed as the conservation reserve, is long range in its objective, and would aid both in meeting today's problem of surpluses and the future's needs as population grows. It would set aside lands that are not needed now and such acres would not be used for cropping or grazing for a specified period of years. The acreage so set aside would include land, much of it marginal, that should logically be set aside.

Farmers would be required to carry out sound soil and water conservation practices on these acres and the federal government would pay the farmer over a period of years to establish the practice. The President's proposal would provide $350 million for the conservation reserve in addition to the $250 million for A.C.P. this coming fiscal year. It was hoped that 25 million acres would be put into the conservation reserve.

There are many complications to the program, as to its administration, payments, etc. which have delayed action, but it is believed that some form of soil bank program will materialize.

A question is the effect of any such program on the agricultural limestone industry. There are many who feel that the acreage reserve program will have little or no effect on the industry and that the conservation reserve phase is the one of most direct interest *provided* that it be tied in more with actual conservation than with surplus crop reduction as such.

Much will depend upon how attractive the application of conservation practices, under the conservation acreage plan, will be made to the farmer. As set up, the overall plan will apply to the greatest extent to the areas which are heaviest producers of farm crops and particularly those crops in greatest surplus.

Congressional reaction to the entire soil bank idea has been varied so far. There is little objection to the principle.

The soil bank would present an entire new concept of farming involving high efficiency working of fewer acres and presumably the application of soil conservation methods on increased acreages when set aside. If carried out anything like the proposed program, it would seem that the agricultural limestone producer will have a larger base on which to work. He certainly will have new challenges presented in merchandising and in educational work with farmers.

We have devoted our emphasis in this issue on agricultural limestone to the soil bank. We have asked many of the nation's leading agronomists to express their opinions and summarize their comments herein. Specifically, we requested opinion as to how the farmer would react as to liming practices, the potential effect on the agricultural limestone producer, what the producer might do to capitalize under such a program and how agronomists would help implement the program.

As usual, we received an excellent

response for which we express our appreciation. A few of our correspondents were reluctant to comment in great detail because there are so many variables and some few preferred to have their remarks held anonymous but the majority were generous in their remarks.

The consensus of opinion is that the agricultural limestone industry stands to benefit. This optimism was qualified by some who believe that agstone sales will benefit in proportion to the industry's initiative in doing a merchandising and educational job. Opinion is that the farmer, if given proper incentives, since he is a business man, will go all-out for more efficient operation of reduced acreage because of his high overhead and operating costs. The alert farmer will want to operate at peak efficiency.

Under a conservation program of the scope contemplated, the potential

Exhibit space at county and state fairs provides an excellent medium for the promotion of agricultural limestone sales. This exhibit material was prepared by N.A.L.I.

and Its Effect on Agstone Industry

for liming in order to raise grass and legume crops could be substantial and a source of added market potential.

It is believed by some agronomists that farmers will treat non-retired acres better than in the past, with greater use of liming and fertilizers, but that there will be a challenge to producers and agronomists to disseminate the best available information on recommended practices.

It is believed by most agronomists that farmers will plant grasses and legumes and other soil-building crops on lands set aside in the acreage reserve. The never-before-limed fields will, however, represent the largest potential.

The soil test is considered to represent a good tool in the educational program required, by proving the need for more liming if the farmer seeks the goal of highest efficiency. Under the acreage reserve program, said one agronomist, a new set of acres likely will be taken out of production each year, and with such a "rotation" plan the farmer will seek maximum productivity of all his tillable acres outside the conservation reserve.

Others say that the farmer will support the program by retiring acres only if he is convinced that he will earn more money by so doing. This is recognized by the government and it also affords the basis for sound educational merchandising.

Opinion is that efforts must be pooled, between the colleges, producers and federal agencies, in order to educate the farmer through advertising, published data and all other means.

Among letters and articles received on the subject were the following:

"I doubt that the Conservation Reserve and Acreage features of the proposed Soil Bank program will immediately have much effect on the use of liming materials by farmers. In time, this program if properly administered in conjunction with other desirable marketing procedures of farm produce should put more money in the farmers' pockets, and, that in turn, should encourage farmers to use more agricultural liming materials. Also, it may tend to induce farmers to get higher yields through liming from their lessened acres in harvested crops.

"Because of the effects just stated, it may encourage producers of agricultural liming materials to exert greater sales pressure in the marketing of their product.

"By helping in the education of farmers with respect to the higher yields and better soil conservation resulting from the liming of soils, producers can perform a real service and at the same time promote their own business.

"The agronomists would, of course, as always, carry on a sound educational program in this connection. It appears that in recent years increases in acre yields have run ahead of increases in population. This situation may continue for 25 years or more. This along with restricted foreign markets for our agricultural products, would seem to be compelling arguments for the need of a Soil Bank Program."—Emil Truog, Emeritus Professor of Soils, University of Wisconsin.

"A majority of farmers will not lime and fertilize their retired land any more than necessary to comply with the law and receive the scheduled payments for not planting a surplus crop and for growing a soil conserving crop. Where lime and fertilizers are essential for the quick establishment of a good vegetative cover, omission of those materials is likely to result in much bare soil and in its subsequent loss by the actions of wind and water. In my opinion, it would be a better practice to establish a ground cover of a long-lived grass than a short-lived legume. In general, the grasses are not as sensitive as legumes to high acidity.

"Most farmers will treat their non-retired areas better than in the past and probably such additional treatments, including liming materials, will equal, at least, any decreased use on the retired acres. The more intensive fertilization of the non-retired acres may defeat the purpose of the program: reduced production of certain crops.

"It should be the policy of lime-

stone producers and agronomists to disseminate the best available information and recommendations on the procedures which will be most effective in keeping the soil in place and improving the potential productivity. Such procedures will vary widely with differences in soils, climates and crops."—B. A. Brown, Agronomist, The University of Connecticut.

Favorable to Producers

"The Soil Bank plan, if put into action, should have a favorable effect on the agricultural limestone producer. I say this for a number of reasons. First, the intent of the Soil Bank idea is to take some of our land out of production and put it into grass or legume which would build up the organic matter level of the soil and improve the structure of the soil so that in the future when we will need this land to feed our increased population it will be in excellent condition. In order to maintain a good stand of grass and legume rather than weeds the soil should be given an application of lime and fertilizer as needed at the start. Since no removals will be made, the maintenance applications will be low. Most of the land the farmer will take out of production will be his poorest, most eroded land and it is probably the land most in need of treatment. If the farmer were well enough impressed with the need for this and the long time benefit he would obtain, he probably would either on his own or through government subsidies apply the needed lime application.

"The second factor which will induce the farmer to still use agricultural limestone or increase the use of it is that he will be putting in more effort to increase production on his remaining acres. He will be able to put in more effort per acre, and to make this effort pay off he will be more conscious of the need for lime and fertilizer. While the acreage may be reduced somewhat, the use of limestone could readily be increased since we are not using nearly enough limestone to maintain our level as well as correct the acidy condition of the soils which have not been limed for 10 years or more.

"Third, I believe that any program where the agronomists and limestone people could impress the farmers with the need for having their soils limed up to pH 6.5 or 7.0 would increase the use of limestone. Many farmers are not aware of the acid condition of their soils. They still can grow most crops but they don't get as large yields as they might if they had their soils limed.

"Farmers should be impressed with the much greater amount of hay or pasture that can be obtained with legumes, such as alfalfa, which require sweet soils than the amounts they get from those species which tolerate a more acid condition. Liming acid soils is one investment that the farmer makes which always gives a high economic return on the investment.

"While the mandatory soil test has been thought by many to decrease the use of limestone, the soil test can be used to increase the use of limestone by promoting the use of soil testing in general so that the farmer finds out that he is in need of limestone on his farm. If the soil were not tested the farmer could go on for many years ignorant of the need. The high proportion of soil samples tested which show the need for lime points to the possibility for success from this approach.

"For the above stated reasons, I believe that a Soil Bank program would increase the use of limestone and fertilizer."—S. A. Barber, Associate Professor of Agronomy, Purdue University.

"I believe that any concept of a soil bank in the sense that the soil is to be preserved or even improved without immediate production on a large scale, that more limestone could be used, especially a somewhat coarser grade of limestone. This is the best method of improving both the top and subsoil. It makes the chemical aspects of the subsoil better for future use when it is necessary to bring that land back into production. I think that would be true on almost any of the land east of the Mississippi River.

"I suspect that more liming material should be used for the production of legume seedlings, and judicious use of liming material not only prevents soil from becoming more acid but it would help retain more of the other plant nutrients in the soil which tend to leach out if the soil continues to become more acid. In general, I believe that more agstone could and should be used in the strict term of the soil bank without immediate and excessive plant production, especially in comparison to nitrogen, phosphate, or potash."—Anonymous.

"Details of the plan and its administration are not entirely clear to me at this time. Whenever acreage restrictions have been in effect in the past there has been a tendency for farmers to increase production on the unrestricted acres. I suppose this will happen with the new plan and will cause greater use of fertilizer and liming materials where deficient.

"If full benefits are to be secured on the diverted acres under the soil bank plan, a program of soil treatment, including liming and seeding to soil-improving crops, seems imperative. Perhaps this is intended. Until the new law is passed and interpreted we will not be sure.

"Agricultural limestone has always been a good "buy" for Illinois farmers who are operating sour soil. The present price squeeze has tended to emphasize careful buying and I believe many farmers are becoming more aware of the bargain they have in limestone."—L. B. Miller, Assistant Professor, Soil Fertility, University of Illinois.

"The soil bank will undoubtedly increase the need and demand for limestone (in the humid belt—in the zone of lime-deficient soils) and also other fertilizing materials along with grass and clover seeds.

"Limestone producers should be in a position to produce, deliver and spread on farms high quality limestone at a reasonable price.

"Agronomists will supervise and interpret soil tests for calcium and magnesium and nutrients.

"This program will help to conserve soil fertility for which it is needed to supply nutritious food for our increased population."—Arnold Klemme, Assistant Director, Experiment Station, University of Missouri.

"With no assurance that the soil bank program is going to pass the present Congress and even though it did pass, certainly there are no clear-cut definitions as to what the implications will be. I certainly am not in a position to make any remarks relative to the questions which you raised. I can say this, we cannot have a sound conservation program without the widespread use of liming materials. If the government program is directed toward improving the welfare of land taken out of production then undoubtedly limestone should play an important part in that and the industry could well afford to exploit that angle.

"It is my opinion, however, that agricultural programs aren't going to help the limestone industry much unless such a program helps the financial status of the farmer. The limestone industry should get on the ball and meet fire with fire. The nitrogen industry continually promotes the idea that legumes are not needed. Such propaganda sells the limestone industry down the river.

"The limestone people and the legume seed companies should get together and through a concentrated program promote lime and legumes for the many situations where information gives evidence of the fact that

maximum production will not be secured without the use of these two in combination."—A. L. Lang, Professor, Soil Fertility, University of Illinois.

"Unfortunately, I have not found any paper or any detailed description of just exactly what the plans for solution of the farmers' problem by this means intends to do. I am interested, however, to believe that we are making progress when we can get such words as soil fertility, soil bank, soil conservation on the farm by the farmer, into the public press. I think you will see from the paper we had with you last year that we have a belief that soil conservation will not be done by the folks in Washington. I don't believe they know enough about the entire farm or the United States as a whole with which they are concerned. I believe the information must be detailed to the extent as we find it on the average farm when the farmer knows every piece of his land because he probably has turned it. So I regret that I haven't anything to transmit to you and I doubt whether I shall have time because I am covered up with things I must write now and two or three deadline dates are burning my patience tremendously.

"I think that I have suggested previously that we must have the same kind of economics for the creative capital; namely, the soil fertility, which the farmer uses in his business just as we have perpetuation of monetary capital on the paved streets. When the farmer "owns" the land (he put his money into it) he should be paid (in money) for the fertility going off the farm. He should include that in the cost of production and set the price of his products so as to perpetuate his assets (fertility) in every sale in place of liquidating them as he does when the price he gets is set by others than himself. With the economist entering into national thinking, it is a challenge to the role of the economist to set the economics of agricultural production, costs, perpetuation of fertility capital, etc., on the same foundations as we perpetuate monetary capital in industry, etc. It is this distorted economics that puts the crowd at the fertility-receiving end, namely the city, and takes them away from the fertility-donating end which is the country."—W. A. Albrecht, Chairman, Dept. of Soils, University of Missouri.

"If the proposed program is designed chiefly to remove surplus grains, cotton, etc., from government storage, it would probably affect a comparatively small percentage of Kentucky farmers. That is, if we assume that, with this purpose in mind, only land formerly grown in corn, wheat, and cotton, is eligible for a "soil bank." Some Kentucky farmers, particularly those of the western half of the state who grow wheat and corn on the more level upland—corn, soybeans, and a little cotton on the level land adjacent to the creeks and rivers, could participate.

• Whatever the fate of the soil bank proposal in this Congress, the subject holds much interest among experts in agriculture judging from the response from agronomists to our request for comment. Consensus of opinion among the nation's leading agronomists is that the soil bank principle has merit and could open enlarged markets for agricultural limestone. Their comments on how producers might capitalize hold interest and it is our desire to give as much space as possible in *Rock Products* to the subject. In order to do so, and in view of the generous response, comments of agronomists in addition to those in this issue will be published in the May issue.—The Editor.

"If the "soil bank" idea should also have as its purpose the establishment of an acreage reserve that would be maintained and protected for future use, a larger percentage of Kentucky farmers could participate, provided some of the less productive land is eligible for an acreage reserve program. However, 82 percent of Kentucky farms have less than 180 acres. On most farms of this size and smaller, every acre must be used to get efficient use of machinery and equipment, produce feed to maintain an efficient livestock enterprise, and to fully utilize the productive labor of one or more men. To participate in a soil bank, many of these farmers would have to reduce their livestock or crop enterprise to a point where the farm unit would lose efficiency in providing productive labor and the use of machinery already on the farm. However, if such action should eliminate surpluses, equity for farm products in the market might compensate for a slight loss in efficiency.

"If the "soil bank" idea becomes a reality, and assuming that to participate farmers must seed the soil bank acreage to a soil conserving sod crop and maintain that crop as long as this acreage is a part of a "soil bank," considerable thought and planning should be devoted to determining the most economical methods of establishing and maintaining such cover. This is true even though assistance is offered through Agricultural Stabilization and Conservation.

"Extension Agronomists would have about the same responsibilities in the "soil bank" program as they have with the forage production and utilization program already in operation. They should counsel with farmers on the type of vegetative cover to establish methods of establishment, maintenance, liming, and fertilizer practices.

"Farmers who participate in a "soil bank" could use Kentucky 31 fescue to good advantage as the grass in the sod. This grass is sturdy, fairly easy to establish, forms a dense sod, survives well in wet or dry soils, and competes well with weeds. If a legume should be required or desirable, Korean lespedeza or ladino clover would work well.

"If Kentucky 31 fescue, or any other grass and either of the above clovers were used, neither crop has an especially high lime requirement. However, many Kentucky soils will need an application of about two tons of ground limestone per acre to establish the cover and maintain it for the duration of the program or a period of eight to twelve years. It will probably be more economical to apply whatever lime is needed for the duration of the "soil bank" at the time of establishment than to attempt to come back to the area with labor and equipment from time to time to make applications of either liming materials or fertilizer. Therefore, the coarser ground, longer lasting agricultural limestone will be most economical. Finely ground or pulverized, more expensive limestone will be less economical in this program because enough dust is usually formed in the coarser materials to give the quick results needed for the above crops.

"Whatever phosphate and potash is needed should be applied at the time of establishment, and farmers should select the cheapest source of the plant nutrient. Since farmers will not be allowed to remove forage from the area either as hay or pasturage, it should not be necessary to make additional applications of these two elements. Phosphorous will stay in the soil until it is removed by a plant, and if the plant returns as crop residue, the phosphorus will be returned to the soil. Potash and limestone act in the same way except that some of both may be lost by leaching. However, the native supply of potash in Kentucky soils is

high enough that annual release from this supply should maintain a level that would eliminate the necessity of maintenance applications. In such a program the need for maintenance applications of limestone would come several years apart. A nitrogen application to get the sod established is all that would be needed.

"The soil bank idea, regardless of the intended purpose, will probably have little effect on the amount of limestone used by Kentucky farmers. If the program becomes effective in 1956, part of the money now available for limestone and phosphate will go for materials for the areas assigned. After these areas are established, farmers will probably continue to invest about the same or slightly increasing amounts in soil building materials, but they will be concentrated on other areas of the farm which are now being inadequately treated. It will be a case of more efficient treatment of the reduced acreage.

"Producers of agricultural limestone can promote greater use of the material by assisting in a program to teach farmers the value and economics of limestone use. Many, many acres in Kentucky would be farmed more profitably if they had an application of limestone.

"Since the "soil bank" idea is so speculative, I prefer not to be quoted."—Anonymous.

"Actually the soil bank plan is of less concern to our state than to states which produce the surplus commodities so much in the lime light. Some of our farmers are worried for fear the program will result in increased prices of feed grains. Since we raise none of these, none of our crop land would be taken out of production and retired to pasture or sod crops.

"The possibility of the acreage reserve program being beneficial to our farmers is very good, since we do have a great deal of poor pasture land which needs to be put in trees, as it is not needed to produce milk. And I am sure that many farmers would be better off to remove some of the very poorest pasture from production and concentrate on their better land, with more limestone, more fertilizer, and better management.

"I doubt very much if the soil bank program will have much to do with the farmer's attitude toward the use of liming materials. With enough promotion, I expect other soil conserving practices could become more important. Since this plan, according to my thinking, would have little effect on the farmer's attitude, I don't see how it could have much effect upon the production of agricultural limestone, and I am not sure that even though they participate and correlate their efforts with such a program that a greater use of lime would result. With some acreage removed from crop production, I can visualize a decreasing need for lime but at the same time some lime will be needed for the establishment of sod crops. No doubt the wheat growing areas will require less for this purpose than will the cotton or corn growing areas.

"I am sure that agronomists will be needed to make recommendations for establishing sod crops. No doubt there will be a tendency for farmers to try to increase production on their remaining acres and to this end extra lime might be needed. I am not greatly worried about the necessity for increased production per acre due to a growing population because, as I understand it, the soil bank plan will remove these acres for a limited period of time, making it possible for them to be returned to crop production as needed."—Anonymous.

"The immediate result of the proposed Acreage Reserve and Conservation Reserve Programs will depend quite largely upon the terms of the legislation if passed. If the terms specify that soil must be limed to a definite pH near 6.5 to 7 to grow grass and legumes, the immediate result may be some increase in the use of agricultural limestone. This assumes that the farmers' most productive acres will not, at the start at least, be retired from production. If the act also specifies that when grass or grass and legumes are seeded that fertilizer must also be used, as I assume it will on most soils in the humid Midwest, there may be some increase in fertilizer consumption. This assumes that the new law will require an average usage greater than the average farmer is now using on these cropped acres. If the new legislation specifies payment for seedings of soil building grasses and legumes, there may well be an increase in demand for seed of the species used in different sections of the country.

"So far, I have assumed that acres taken out of production will be put into grass or grass and legumes and a good stand maintained. No doubt there will be some acres on steep land or very badly eroded land which should be put back into forest. If the new legislation contains such a program, its makers must envision a soil conserving program with long life.

"This new program, if passed in a form which gives it a long life expectancy, may make provision for rotation of acres in the reserve program. This would seem logical for acres retired to grass or grass and legumes. The first basic assumption for this conclusion is that land put into reserve will be acres which have been cropped to the grains now in surplus. The second basic assumption is that rotating acres in grass, say at five-year intervals, will better conserve our nation's soil than continuous grass on one field of a farm.

"You will notice that I have mentioned grass or grass and legume seeding of retired acres. The seedings specified in the proposed law will, no doubt, consider a vigorous grass sod as soil building. Legumes in a sod probably will also be considered soil building. If the objective of the proposed act is to conserve soil by periodically rotating seeded acres, I believe emphasis will be given to using both grass and legumes and raising soil productivity by the use of lime and fertilizer. The other alternative of seeding grass on acres which are to remain in continuous grass probably would not require the use of as much lime as the seeding of both grasses and legumes. Part of the decision may also hinge upon whether or not the seeded acres are to be pastured. If they are, the pasture mixtures will no doubt include legumes such as ladino clover and birdsfoot trefoil for the Midwest."—Russell K. Stivers, Extension Agronomist, Purdue University.

We must recognize the financial incentive required for most Americans to act. If the farmer recognizes a practice as being to his financial advantage, he will use all sources of financial assistance to better his standing. If the program referred to appears to have financial advantage, he will accept liming materials and other soil conserving practices. If he is not sold on the program, but feels morally obligated or forced to accept these practices because of penalties in connection with his allotted crops, he will accept them half-heartedly and the lack of proper application or timeliness of operation will result in very little good. If on the other hand, the farmer is sold on these practices to the effect that they are beneficial to him, with or without Government assistance, he will accept this assistance in good faith and the program will be successful.

"If the proposed program is sound and includes agricultural limestone as part of the program, there would be an increase in the consumption of agricultural limestone. If this program permits those selling limestone to deliver their material through Government offices without the need of salesmen, the companies would gradually lose contact with their consumers. This

(Continued on page 85)

What About Lime and Fertilizers In 1956?

By C. J. CHAPMAN*

FARMERS IN WISCONSIN, in fact the country over, are right now in somewhat of a dilemna. Here on the one hand, we of the Land Grant Colleges encourage farmers to fertilize their crops, to use limestone, to produce more bushels of corn, grain and tons of alfalfa per acre. The Federal Government has supported prices at a fairly high level for several years now, and this has thereby made it profitable for farmers to use more limestone and more fertilizer, to grow more corn, grain, and alfalfa in order to better feed their dairy herds and other livestock with more home grown protein feeds.

Our Support Price Program has also encouraged and made it profitable for farmers to cultivate more acres of relatively poor land which with nitrogen, mineral fertilizers and liming material, has further increased the production of feed food and fiber. Farmers in turn have purchased more and more machinery to operate this additional acreage. The combined effect of all this has been to build up a tremendous farm overhead. Land values have risen to record heights. Farm inventories of machinery equipment are at an all time high. The net result of this program of liberal fertilization on an expanded acreage, stimulated by support prices, has given us these staggering stockpiles of surplus feed, food and fiber.

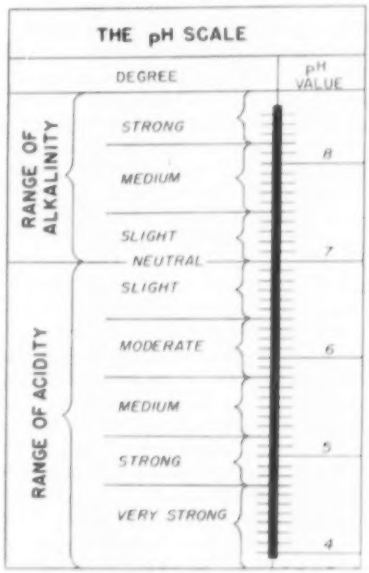
But this situation just cannot continue! We must, of necessity, adjust our acreage devoted to the production of corn, wheat, cotton and other crops to our domestic and export demand requirements. Yes, we in Wisconsin and other dairy states must adjust our dairy cattle population, the farmers in the beef cattle and hog producing states must adjust their beef and hog population down to domestic requirements.

What with high federal income and local property taxes, high machinery costs, with hired labor at all time highs, soaring living costs to the farmer and his family, plus interest charges all adding up to our present very high per acre overhead, of necessity, we must make every crop acre, every dairy cow in our herds produce to the limit of its capacity. And we of the Land Grant Colleges will continue to promote the use of lime and *fertilizers* in a program of low unit cost crop and livestock production.

There are many of us who for years have contended that part of the millions of dollars that were being spent in a support price program might better have been spent in paying farmers for taking these extra acres out of production, acres of marginal and submarginal which are subject to wind and water erosion and which should be retired and held in reserve until some national emergency justifies their being thrown into temporary production. Let's devote these extra acres to the production of grass and trees to provide cover for wildlife. In turn, let's charge the city and country sportsmen a higher fee for the privilege of hunting and fishing in these game reserves.

But there are those who right now are talking about cutting down on the use of fertilizers and liming materials in order to control acre yields as a means of getting at this surplus production problem. I say those who are advocating such a program are talking nonsense. They would throw into the discard all the scientific knowledge that we have gained over all these years of advancement in the field of fertilizing our crops. In fact, we might as well throw out all the advances in this field of production "know-how" in order to maintain a status quo and thus hold down total production.

To discard what we have learned about efficiency in the attainment of high yields of crops on our farm land would be the equivalent of throwing into the discard and outlawing technological advances in the field of science and engineering. Yes, we can revert to "the horse and buggy" type of farming pretty fast by simply calling a moratorium right now on further advances in this field of efficient farming as advocated by our Land Grant Colleges.



In Wisconsin, it has been recommended that liming of acid soils be done at rates that will bring the pH up to between 6.5 and 7.1. To hold soils at this pH, it is necessary to relime at intervals of every 6 to 8 years

And so whether it be the feeding of crops grown on our agricultural land or feeding our dairy herds with balanced rations for efficient production, we must of necessity operate at peak efficiency in order to stay in business. We must not, we cannot, put a ceiling on efficiency in this country. There is no substitute for efficiency. It isn't so much the price a farmer gets for what he produces as it is the cost of producing his bushels of corn or grain, or cotton, his pounds of pork, beef, milk, butter and cheese that counts most.

Right here in Wisconsin, I know that on the surface many city people and others have been pointing their finger at me saying "Hold down that man Chapman on his program of nitrogen and the increased use of fertilizers and agstone." Even some farmers are of the same mind. But I ask these farmers the question "would you cut down on feeding your dairy cows balanced rations in order to hold down on milk production?" "Should I tell farmers not to haul out manure produced on their farms in order to cut down on their total over-all production?" "Why not sell the best cows in your herds in order to cut production?" Well, we know that kind of thinking is not sound.

And so whether it be the use of commercial fertilizers, used to produce top yield, or whether it be the use of lime to correct soil acidity and thus make possible the successful establishment and production of alfalfa, to supply low cost protein feed for our Wisconsin dairy herds, I say we must of necessity follow all of those practices which are so vital to our program of efficient production and long time conservation. Crop cover on our erodible hillsides or the unprotected acres of sandy soils in Central Wisconsin, and as well the vast areas of unprotected prairie soils in the West and Southwest is a conservation practice that is vital to this nation's future welfare. It was the late President Franklin D. Roosevelt who in the early years of his administration said: "The history of every nation is eventually written in the way in which it cares for its soil."

In an article prepared for this magazine three years ago, I argued that the liming of acid soils was really the starting place in a program of soil con-

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servation. The establishment of perennial legumes, such as alfalfa, on our hillsides and as well our erodible level sandy soils of Central Wisconsin was a step prerequisite to the preservation of such lands. The millions of tons of agricultural lime produced under the early programs of drought relief and the FERA back in 1933 and 34 and later converted to WPA work projects, made possible the establishment of thousands and thousands of acres of alfalfa in this State of Wisconsin. Yes, Wisconsin's "green acres" have been made possible through a program of liming, supported all these years by the AAA, PMA, where soil building credits were made to farmers for the application of lime as a soil building practice. Yes, the Action Agencies of the Soil Conservation Service and as well the Farm Security Administration and in the present rather restricted and limited program of credit for liming under the ASC, we have these many years been carrying on a program of efficiency in the field of crop production and as well a program of soil conservation.

Let's follow through on this proposed Soil Bank idea. It's fundamentally sound. First of all we take out of production marginal and submarginal land which should be seeded down or planted to trees and held until some emergency arises where of necessity we can again call on these extra acres for added production.

Let's all get back of the program where farmers are encouraged to lime and fertilize those acres they do cultivate. Credit for lime should be given for its use on all acid crop lands where legume and grass seedings are to be made regardless of the place in the rotation or time of year such applications are made. Credit for lime should be given where applied to our permanent grass meadows thereby encouraging the more profuse growth of legumes in those pasture fields.

Let all of us get back of a program where a minimum of regulations under the ASC are imposed regarding the purchase and use of agricultural lime so that in turn farmers will be encouraged to buy and apply on both crop and pasture land and thus maintain their soils at an optimum reaction of between pH 6.5 and 7. By so doing we make possible the most efficient utilization of phosphate and potash fertilizers in a program of more effective crop cover, soil conservation and at the same time, low unit cost production of crops on our farms.

Lime and the "Soil Bank"

By R. L. COOK*

LIME SHOULD BE THE FIRST DEPOSIT in the "Soil Bank." Acres in the "Conservation Reserve" will be set aside for use in the future, when America's increased population or the hungry peoples of other nations will be needing all the food and fiber which can be produced. In the meantime, of course, with fewer acres under production, surpluses will shrink. It is surely better to use fewer acres than to be content with growing less on all the acres.

Idle lands depreciate rather than build up. This is especially true for relatively short periods of time. When centuries are involved, history shows that soils become covered with grasses, weathering makes mineral nutrients available, nitrogen is added through lightning discharges and good soils result. Such was the history of the productive soils of the prairies. That succession cannot take place during the proposed 5 to 15 years life of the "Soil Bank." Weathering is not that fast and only a few pounds of nitrogen comes down in the rainfall each year.

Legumes are essential for the fast work needed to build soils during the lifetime of the proposed "Soil Bank." Such crops are lime lovers. Experiments show that alfalfa can thrive only on high lime soils. The soils of humid regions are predominantly acid. They are acid because lime is continually being lost by leaching and by crop removal. About 8 million acres of cultivated land in Michigan have been depleted to the extent that 16 to 20 million tons of limestone are needed. That figure is quite conservative. It probably should be much greater. In addition, it would require a million tons annually to replace that which is lost from those agricultural lands which are already acid.

The immediate need for lime is on the acres where legumes are to be seeded. In the "Soil Bank" program this will be on those set aside in the "Conservation Reserve." Tentative plans provide for financial assistance in the establishment of soil building legumes on the designated acres. The first step should be a soil test. Find out exactly how much lime and fertilizer should be applied to assure success in the establishment of alfalfa, the best soil building crop on well drained soils.

In Michigan, sufficient limestone, or an equivalent quantity of some other form of liming material, should be applied to bring the pH up to 6.7. It would be well to make sure that the material is spread uniformly and is well mixed through the surface layer. Where the soil is extremely acid it is well to apply the material before and after plowing, one-half of the requirement at each application.

An adequate supply of mineral nutrients is essential for alfalfa. The crop is soil building with respect to nitrogen and organic matter (the bacteria in the nodules on the roots take nitrogen from the air) but on many soils the crop does not grow well because of a lack of mineral plant food. Two of the most essential are calcium and magnesium. They may be furnished by applying dolomitic limestone. Some soils though acid are well supplied with magnesium. Then calcium limestone is sufficient. A soil test can provide the needed information.

Commercial Fertilizers Also Needed

Lime is essential but not sufficient to supply all the mineral needs of alfalfa. Phosphorus and potassium fertilizers usually help in establishing a thrifty, profitable stand of alfalfa. The extent to which they are needed, and the desirable ratio of one to the other may de determined by soil tests and field experiments. At most of the Agricultural Experiment Stations, field tests have already furnished information to help in deciding the most desirable ratio of phosphorus to potassium.

On Michigan sandy soils where tests show both elements to be low, the ratio should be 1-1, but such test results on a clay loam soil would indicate the need for fertilizers having a 2-1 ratio with respect to phosphorus and potassium. On the "Conservation Reserve" acreage one should plan on a liberal initial application and a smaller application each year or two thereafter. Because hay will not be removed, perhaps an application each three years may be sufficient. Tests will give the answer.

Boron and other minor elements may be added to the fertilizers where they are needed. Local county and state agronomists have information as to where such plant foods may be necessary.

Alfalfa and Bromegrass A Good Team

Alfalfa and bromegrass build soil rapidly. The alfalfa, with the help of the accompanying root nodule bacteria, furnishes nitrogen for the grass and the two supply decomposing plant residues which greatly improve soil structure and physical condition.

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An area of Brookston clay loam soil on the Ferden experimental farm in Saginaw County, Mich., has been continuously in alfalfa and bromegrass for 15 years. The soil today has but slight resemblance to that on a nearby plot which has continuously grown depleting crops; corn, beets, barley, beans, and wheat. A simple test demonstrated the stability of the structure developed in the alfalfa-brome soil at the experimental farm.

Two hundred gram samples of the two soils were dried, screened, and placed in glass cylinders with perforated bottoms. The stability of the soils in water was determined by adding 100 cu. cm. of water and determining the rate of percolation through the column of soil. In the case of the soil from the grass plot, drainage from the bottom started in 16 sec. and stopped in 3 min. and 33 sec. The corresponding figures for the soil from the cropped area were 12 min. and 20 min. When the water reached the unstable granules in the cropped soil, they disintegrated so quickly that water percolation was seriously hindered. In the field, such soil is poorly aerated and rain water runs off instead of soaking in. This tendency of alfalfa and grasses to improve the structure of soils is primarily responsible for their soil building effect, and is probably worth much more in a good management program, than is the actual nitrogen supplied by the alfalfa.

Conserve All Acid Soils by Liming

The "Conservation Reserve" should surely be limed if the soil is acid, but what about the rest of the farm? Conservation is simply another term for "good management." Soil Conservation Service personnel define soil conservation as "The putting of every acre to its best use." In order to do that, it is necessary to add those amendments which will make it possible to grow the crops for which the acre is adapted. In humid regions, lime is usually the first amendment needed.

Corn and small grains are usually benefitted by lime. Some of the benefit may be indirect but it is just as real. The limestone makes it possible to grow soil building legumes and reduces the fixation of fertilizer phosphorus into forms not readily available to plants. The breakdown of such crop residues as straw and corn stalks is, in many soils, increased by lime. This is because the lime brings about more favorable conditions for certain soil organisms which decompose the organic matter and make the nitrogen available.

Liming is the first step in a soil conservation program!

Lime and the Soil Bank Program

By G. W. VOLK*

THERE ARE MANY RAMIFICATIONS of the agricultural program proposed by the present administration which is designed to reduce crop surpluses and bolster the prices farmers receive for their crops. The plan of taking crop acreages out of production and placing them in an "Acreage Reserve" or "Conservation Reserve" soil bank should reduce crop production if the plan is used extensively by farmers.

In order to make this system effective in building up soil productive capacity and conserving it for future generations, when population pressures demand increased food production, good soil building practices must be followed. The mere withdrawal of land from production without a determined effort toward improving it will partially defeat the plan of using it for much greater future production.

Many things could be done on these diverted acres to improve their productivity and prevent them from eroding. They should be planted to good soil building crops such as grasses, legumes or mixtures of them. Such crops as alfalfa, sweetclover, red clover, birdsfoot trefoil, vetch, timothy, bromegrass, orchard grass, bluegrass or fescues could be used.

In order to do the best job of building soil productivity these crops should be well fertilized and in many instances the soil limed to a pH of 6.5 or 7.0. There is nothing as discouraging as to plant land with good high quality seed only to see a sparse sickly stand of the crop because it was not properly limed and fertilized. Even this kind of crop growth, plus the weeds and poverty grass that move in, will help in rejuvenating soil productivity but the results will be poor compared with what could be obtained if lime and fertilizer had been added to the soil.

Soil productivity is not due to liming and fertilizer alone but is a combination of these plus good soil structure. Soil structure is as important in crop growth as are phosphorus, calcium, nitrogen, potassium, etc. One of the most important materials needed to improve soil structure is soil organic matter. It comes from the roots of legumes and grasses and from the aerial parts of the plant that are plowed under. Therefore, practices that increase both root and top growth of a plant should be used to increase organic matter in the soil. Limestone and fertilizer are two very important cogs in this wheel of factors leading to high soil productivity.

Land placed in "Acreage Reserves" apparently may be rotated from year to year. Crops selected for these areas need not be of the perennial type; however, many perennials will fit into a program of this nature. The uses of mixtures of sweetclover and orchard grass or alfalfa and grass would be excellent in protecting the soil from erosion and for improving soil productivity. In order to grow either alfalfa or sweetclover successfully the land should be limed to a point somewhere between pH of 6.5 and 7.0.

This means that a very large proportion of the land in the humid region of the United States that is placed in "Acreage Reserve," should be limed as well as fertilized. As a result several million additional tons of liming material could be absorbed in the new farming program. When these acres are returned to grain crop production, the yield should be considerably higher than when no treatment was used.

Areas assigned to the "Conservation Reserve" will, in general, be treated like the "Acreage Reserve" areas; however, since the "Conservation Reserve" acres will be retained on the same location for a number of years, the crops used should prevent soil losses as well as improve the soil productivity. Here again legumes will play an important role and to grow them successfully the soil should be limed and fertilized.

It may be difficult to get farmers to lime and fertilize land from which crop production cannot be realized immediately. However, if certain inducements are offered such as partial payment for the cost of putting good practices on the land withheld from production, farmer participation will be increased greatly. The idea of building reserves for future crop production and what it will mean to the farmer must be thoroughly explained to him.

The liming and fertilizer industries can do much in making the program a success. This means that industry must know what the agronomists recommend for the retired acres in order to discuss intelligently these matters with farmers, county agents and other interested parties. There are many instances where industry is helping the farmer by assisting in the collection of soil samples for soil tests. It is believed that this type of cooperation can be carried on in most of the states of the North Central Region. In Ohio, soil samples collected in this manner are handled exactly the same as those sent

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to county agents by farmers. If industry takes the samples they must be sent to the soil test laboratory through the county agent's office.

It appears that special efforts must be made by industry to cooperate in the new agricultural program if they expect to increase the use of agstone.

Look to the Unlimed Fields

By JOHN FALLOON*

EACH YEAR FOR SEVERAL YEARS, Missouri farmers have applied about one-third or a little more of the estimated annual needs for limestone. The estimated needs involve all cropland and also the sufficient use of limestone on all non-crop open pasture land to permit the satisfactory growing of grass-legume mixtures.

With the actual use so far below the estimated need, a logical question is why. Is the estimate too high? Are the rates per acre used too low? Or is the problem largely a matter of some land that needs liming receiving none? Several other pertinent questions could be added to this list, but these are significant.

The estimate of needs is good enough. Sure there is a question as to whether the actual need is 5 million or 5.5 million tons annually—but "so what." The use is so far below the needs that there is no question about the soundness of an expansion in the total tonnage of limestone used. However, the need for more total tons does not mean just more tons, but also involved is where the extra tons should be used.

Unquestionably some of the limestone in years past was spread at too light a rate for one liming to supply the soil's need. But repeated applications to the same land means much of it now does not need more lime, but some other treatment is needed. The greater part of the still unlimed fields on most farms probably need an application at a heavier rate per acre than originally made to most of the fields that have already been limed. This is likely to happen with the tremendous expansion of the soil testing program.

The never-limed fields represent the big potential the next several years, both from the standpoint of sales by limestone producers and distributors and the values to be received by farmers for the tons of lime which they spread. Some fields are hard to get to with a loaded truck. The limestone intended for many such fields has been unloaded instead on a more convenient field. Lack of accessibility is a real problem, for the trucker and the farmer too. Yet from the standpoint of the agronomics involved that soil is no respecter of the physical difficulties involved.

Limestone producers and distributors might well visit old customers and also prospective customers to work out means of getting fields limed that heretofore have not been limed.

The influence of the "soil bank" plan upon limestone use is of course highly debatable at this time. To the extent that it encourages the retirement of the most unproductive land and at the same time requires the use of conservation practices including limestone applications on that land, the program likely will add to greater limestone use.

*Extension Professor of Soils, University of Missouri.

Intensify Farming Under Soil Bank Plan

By J. B. PETERSON*

A SOIL BANK PLAN, removing land from active crop production, would certainly have an effect on the production practices of many farmers. The acres in the soil bank would need to be handled in a way that would give the greatest future advantage to the farmer and to the nation. This conserving and improving of land which is not being cropped or grazed would be a new concept to most American farmers.

Then, too, the farmer with the same amount of equipment, and, in many cases, the same labor will be actually farming a smaller acreage. This may encourage him to intensify his farming enterprise, including the liming and fertilizing practices. Finally, if a Soil Bank Plan affected the prosperity of the farmer in any way it would also affect his ability to buy liming material and fertilizer and to make other soil improving investments.

Land taken out of production by a soil bank plan would be of two types. Some would be good crop land put on reserve temporarily until surpluses are removed and more production is again needed. Some would be poorer land which is difficult to keep in profitable crop production. The President in his recent message to Congress encouraged putting the latter into a more permanent "Conservation Reserve" of primarily grass or trees. Since there may well come a time when agriculture's full production is again needed, both types of land in a soil bank would need to be conserved and even improved in preparation for future production.

The intelligent farm owner would logically put legumes or legume-grass mixtures on good land which he had in the soil bank if he expected the land to come back into the production cycle in future years. A good healthy stand of a legume would stop soil and water loss and, in addition, put free nitrogen into the soil. Each year the legume stood on the "reserve" acres, the farmer would bank a dividend in the form of atmospheric nitrogen captured by the bacteria "Rhizobium" in the root nodules of the legume. But lime, phosphorus and potassium are especially critical in getting legume stands and in maintaining them over a period of years. Also the nitrogen fixation, which is the big advantage in using the legumes, may be retarded by an acid soil; so liming is doubly important. A large acreage of soil bank land going to legumes would thus be expected to give special encouragement to increase use of agstone.

If many acres of poorer land were put into a more permanent "conservation reserve" of grass or trees the effect on the farmer's use of liming material, fertilizer etc., might be largely indirect. Cutting down the acres in production could mean more intense farming on the remaining acres to provide sufficient agricultural commodities in future years.

When the farmer enters a soil bank program, the size of his productive farm is immediately decreased. Yet he can be expected to attempt to maintain his total productivity by farming the fewer acres more intensely. We know that the general level of lime and fertilizer use at present is far below the point of greatest profit, so one of his first steps should be to increase their rates. I think we could expect many farmers to do this.

If the prosperity of the farmer was affected by a soil bank program his limestone and fertilizer usage might also be affected. The farmer with little cash or credit is not a good market for these products even though he may realize that it would be a profitable investment.

If a soil bank plan becomes effective, the agronomist must provide the farmer with sound information on how to conserve and improve the acres in the reserve program. In addition, they must help him find the soundest system of utilizing the land he still has

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in production. The proper use of lime is one of the steps in a sound soil program whether the land is in active production or in reserve. Agricultural limestone producers have an opportunity to encourage farmers to make a proper and more effective use of lime. A soil bank program which would encourage larger total acreages of legumes, plus more intense farming of the acres not in the soil bank, should increase this opportunity.

How Will the "Soil Bank" Affect Limestone Sales?

By EARL E. BARNES*

UNTIL WE KNOW what the provisions of the "Soil Bank" will be, it is impossible to evolve any logical idea of what effect it will have on the consumption of agricultural limestone on the acres involved. Certainly if this land is to be moved into the production of trees, there will be little incentive to liming the land. On the other hand, if it is moved into the production of some crop to build fertility into the soil, it will be a different matter. In the latter case, sweet clover stands high as a soil improving crop, and it is absolutely necessary that the soil be neutral to grow this crop.

In the legume reaction experiment at the Ohio Agricultural Experiment Station, on the range which kept at a reaction of only 4.5 pH, the yield of sweet clover was only 0.02 tons per year as an average of 8 years. At the next higher reaction, 5.0 pH, the yield was no better. Moving to a reaction of 6 pH the yield increased to 0.78 tons. At neutrality (pH 7.0) the yield was 1.85. At a reaction a little above 7.5 the yields increased to an eight year average of 2.76 tons per acre. These yields were obtained without the addition of any phosphate fertilizer. On phosphated land the yields were 0.01 tons at pH 4.5; 0.07 at pH 5.0; 1.6 tons at pH 6.0; 2.89 tons at pH 7.0 and at the highest reaction, about pH 7.5, the yield was 3.25 tons.

On both phosphated and unphosphated land the highest yield of sweet clover was obtained at the highest reaction. It would seem then that if land which is moved out of production is to be put in sweet clover as a soil improvement crop, much of it will need heavy liming to accomplish the desired end.

If the retirement of land from the production of salable crops reduced the surplus as hoped and prices move up as planned, this will have the effect of giving the farmer more money to spend, and if good sales effort is carried out by the limestone salesmen, a liberal share of this increased income should be spent for limestone. Even if some land is retired from production, on those acres still producing salable crops, those which make the largest yields will produce crops most economically. As can be seen from the following table largest yields were produced on neutral soil. This was demonstrated by the yields at different reactions in the same experiment mentioned above.

On land which was fertilized with a phosphate-potash fertilizer, the yields were as follows at the five different reactions:

	pH 4.5	pH 5.0	pH 6.0	pH 7.0	pH 7.5
Corn	13.9 bu.	31.6 bu.	37.2 bu.	49.6 bu.	44.0 bu.
Wheat	26.3 bu.	29.3 bu.	32.5 bu.	39.5 bu.	38.9 bu.
Alfalfa	0.07 tons	0.26 tons	1.17 tons	2.76 tons	2.76 tons
Lime cost per A.*	———	———	$12.00	$27.00	$71.00

*Ground limestone figured at $6.00 per ton applied to the field. This was the total cost for lime over a period of 18 years.

From the above data it will be seen that yield of these crops reached their maximum at the neutral reaction, pH 7.0. Here the cost of neutralizing the soil and maintaining it at neutrality for 18 years was only $1.50 per acre per year. Corn yields were 12 bushels greater than at pH 6.0; wheat yields were 7 bushels more and alfalfa yield was more than a ton and a half more. The difference in the cost for lime per acre per year to hold the reaction at pH 7 rather than pH 6 was only a little more than 80 cents.

There are doubtless many farms which have been limed years ago but where the reaction is now only about pH 6.0 if maintenance applications have not been applied as the reaction fell. These offer a challenge to the limestone salesman to seek them out and show the farmer what can be expected from a program which keeps the soil neutral.

*Assistant Professor, Ohio Agricultural Experiment Station, Wooster, Ohio.

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Sales Manager

GEORGE ROSS has been appointed sales manager of Inland Cement Co., Ltd., Edmonton, Canada.

AGRONOMIST OPINION

(Continued from page 80)

would result in long time disadvantages to the limestone producers.

"Limestone producers should accentuate their sales program even though much of this limestone were handled through Government agencies, and particularly pay emphasis to those crops requiring lime and not included in the soil improvement practice. The farmers using limestone as part of the soil improvement program should be as familiar with the sales agency and the economic advantages of the limestone used, as though it were sold through commercial enterprise. If this is not done, the farmer will not be an enthusiastic customer.

"Recently, I received two letters from County Agents in the eastern part of the state with overliming problems. One of these was on soybeans and the other on peanuts. The soybean problem was considered sufficiently extensive so that an airplane study was made of the northeastern part of the state last year with follow up work on the ground level. Unfortunately, it is the better and more progressive farmer who has been and will use assistance for liming materials and soil conservation practices. For example, one of our leading farmers advised me last year that all of his pastures had been limed to the point that the pH value was in the neighborhood of 6.8 to 7 and that he was not permitted to purchase any more lime for soil conservation practices. His question was to the effect of how he could take advantage of this soil conservation assistance.

"If the requirement for a soil test had not been in effect, the taxpayers would have continued to have paid for lime for this farm when everyone would agree that further applications of lime would not bring about soil conservation or economic return. As the program continues, the limestone producers should be as much concerned as the agronomists that limestone should be applied on those fields which need it but should not be a part of a soil conservation program on those soils which are adequately limed.

"There are periods during the year when the facilities of the Soil Testing Laboratory are woefully inadequate, with other periods when the facilities are not used to their full capacity. Since a sound liming program is not seasonal in nature, public supported assistance to the farmer should be organized so that soil testing facilities could be used to the best advantage to assure that the assistance will be beneficial and not detrimental." — Anonymous.

Overall view of plant showing No. 2 screening tower behind central control building, to the left, and to the right is No. 1 tower

Produce High Calcium Limestone and

A VARIETY

. . . of products are processed in new, all-steel plant of Stockbridge Stone Co., Calera, Ala., for chemical and metallurgical industries as well as commercial aggregates

LATE IN 1955, STOCKBRIDGE STONE Co. placed in operation a new, modern crushed limestone plant near Calera, Ala. The Stockbridge Stone Co., with headquarters in Birmingham, operates quarries at Kennesaw, Norcross, Stockbridge, and White, all in the State of Georgia. This company is owned jointly by the Birmingham Slag Co., Birmingham, Ala., and Lambert Bros., Inc., Knoxville, Tenn.

Two sizes of high calcium limestone for metallurgical and chemical purposes as well as commercial aggregates are being produced at Calera. The fluxstone is for the expanding steel industry in the Birmingham, Ala., area. Agricultural limestone may later be an important product of the new plant. At the time of inspection the plant had been in operation about three months. Preparatory work for the operation started about a year ago.

Traveling stacker belt conveyor in the background with long feeding belt conveyor, to the right

Located on the L and N Railroad, the new operation is 32 miles south of Birmingham and two miles north of Calera. It is in an area replete with limestone and lime burning operations. The surface contour of the deposit is irregular and covered with brush and small trees. The company has extensive holdings here and core drilling has proven up enough material to last many years. The deposit, which is bedded and dips to the east, has thick strata in both high calcium and dolomitic limestone so that by selective quarrying a high calcium stone, or a dolomitic limestone may be obtained. The high calcium stone is a little softer than the dolomite and its surface has more pockets. Core drill holes have been put down to the 300-ft. horizon.

The plant is of steel construction throughout. Principal features include the primary crusher, a surge pile stockpiling system along with an interesting reclaiming belt conveyor tunnel, and four separate screening towers: Nos. 1, 2, and 3, and finally a rinsing tower ahead of car and truck loading. The screening towers are spaced over a considerable area and belt conveyors are used throughout the entire operation. The plant was designed under the direction of J. H. Pigford, chief engineer and built by the company staff with Wm. E. Hinkle, plant engineer in charge of construction. It has a ca-

All important plant operations are controlled from these electrical switch panels

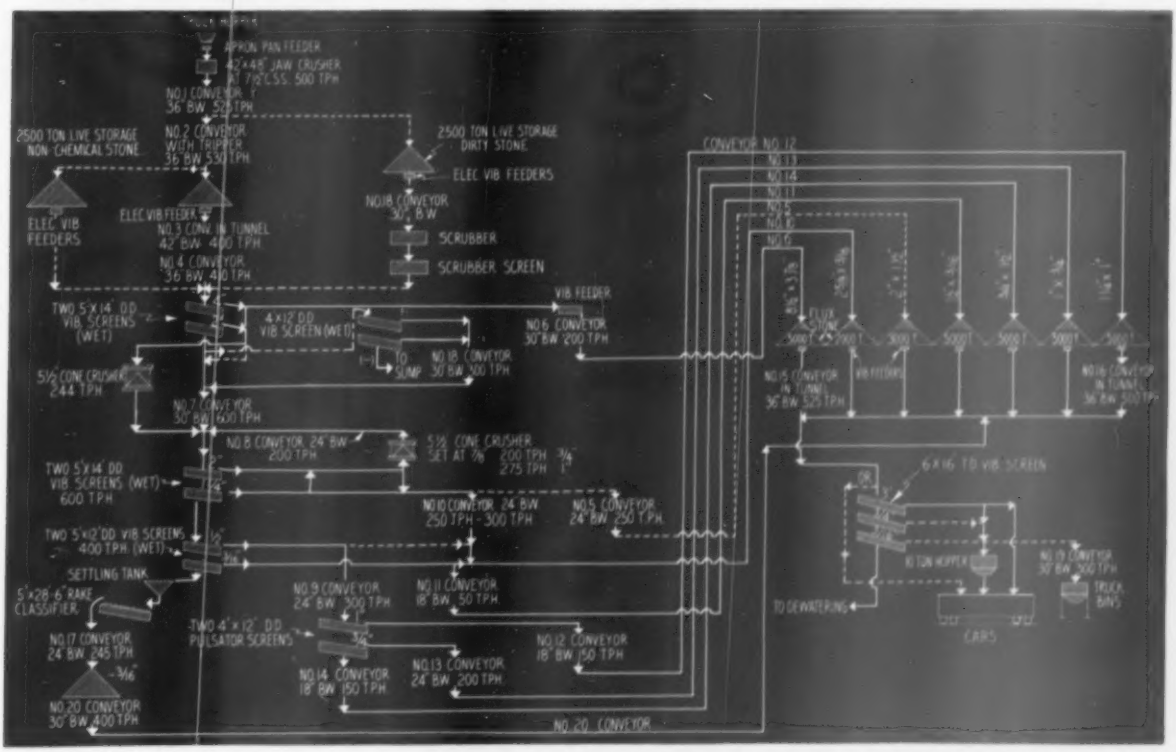
By WALTER B. LENHART

Dolomite Products from Same Quarry

pacity of 500 to 550 t.p.h. Two sizes of fluxstone are produced and five sizes of smaller aggregates as well as a minus $\frac{3}{16}$-in. material. To insure a clean product, all stone is washed three times as produced and again as loaded.

All the operations of the plant are controlled from a centrally-mounted control tower. One control panel is used for all the Jeffrey-Traylor feeders in the plant and under the finished storage piles. This panel was supplied by Jeffrey-Traylor. A second panel, company-designed and made, controls all other operations of the plant except the primary crusher and the stacking assembly. This control is located in the crusher house. Essentially, from a strictly operating standpoint, one man runs the screening and washing plant, the two secondary crushers, reclaiming, and related work. Two men are assigned to the car loading job.

In the office of the superintendent are three Bristol recording ammeters. One is connected to the motor driving the No. 1 belt conveyor from the primary crusher, a second on the motor driving the belt out of the surge pile, and the third is on the loading belt motor. The recorders are so located that the superintendent can see at a glance the condition of the main drive



Flowsheet of plant designed to produce a large volume of chemical stone and non-chemical stone products. Plant has large stockpile and reclaiming facilities to handle a wide variety of sizes

Finished material storage piles with conveyors fingering over the piles. Large size flux stone in foreground with silo for smaller flux stone behind pile in foreground

motor elements under his supervision.

The limestone deposits are made up of a series of four high calcium beds with dolomitic limestone beds sandwiched between. The high calcium beds vary from 60 to 100 ft. thick, and the dolomitic limestone strata from 40 to 100 ft. thick. The beds dip rather steeply to the east with the strike being generally north and south. Surface and open pit mining of the two types of rock consists in essence of working that type of rock that is needed to meet sales requirements. After the stripping operations are down to the clean rock, quarrying is conducted by following the strike of a particular bed; high calcium limestone, or the dolomitic stone. A high degree of selectivity is possible in this type of deposit, and the general plant set-up is such that the two materials can be processed separately. The high calcium limestone has an average of 95 percent calcium carbonate or better. The dolomitic limestone has a Los Angeles rattler rating of 25 and the high calcium limestone a rating of 30 so both these types of rock are well above specifications for concrete and black top aggregates. The stone is blue-gray in color.

Stripping Problem

Stripping of the deposit presented a problem as the top of the beds are eroded, irregular and pockety in nature. Crevices extended down into the limestone and these are filled with clay material. Therefore, the depth of the overburden is from zero to 30 ft. The top material is first removed with a 1½-cu. yd. Northwest dragline with a backhoe used at times. Much of this work is done by contract. This will usually remove from zero to 10 ft. of the spoils, leaving limestone outcroppings exposed along with a considerable amount of remnant soil. A top slice of about 20 ft. is next made, using tractor-mounted drilling equipment drilling horizontal holes. No set pattern of drilling is practiced at this time because of the uneven nature of the top strata of rock. Dupont explosives and detonators are used.

The debris removed by this top slice if predominantly top-soil is hauled to the spoils disposal area, but if mostly surface rock it can be sent through the primary crusher and to a dirty stone raw storage pile that is a part of the raw stone surge pile system.

Loading in the quarry is done with a 2½-cu. yd. Northwest and a 2½-cu. yd. 54-B Bucyrus-Erie shovel, both diesel-driven, to a fleet of seven 15-ton, rear-dump trucks. Five are Macks and two are Euclid and both makes are diesel-operated. An Allis-Chalmers tractor and dozer is available on the quarry floor for clean-up operations.

Four company-assembled, tractor-mounted, portable jumbos with two heavy percussion drills on each tractor are used for primary drilling. Each carries its own 600 c.f.m. air compressor, and the units are made up of both Ingersoll-Rand and Gardner-Denver equipment. They are essentially wagon drills, and can drill vertical, angle, or horizontal holes.

As the quarry opening is alongside the primary crusher, the trucks on arriving at the crusher turn and rear dump to a 48-in. by 14-ft. heavy-duty apron feeder that delivers to the 42- x 48-in. Telsmith primary jaw crusher. The crusher is of the overhead eccentric type. It has a rated capacity of 500 t.p.h. with a 7½-in. setting. Crushed stone throughs go to a rock box from which the material slides onto the horizontal 36-in. off-bearing belt conveyor, 525-ft. centers. This conveyor delivers to a tripper that serves a 36-in. traveling stacker belt. When top-slice material is being processed, or rock that contains large clay inclusions, a man is stationed alongside the first belt to pick off the lumps of undesirable materials. Belts No. 1 and No. 2 have rated capacities of 525 and 530 t.p.h., respectively, and both are B. F. Goodrich units. Other conveyors in the plant include Manhattan and Goodyear belting.

Stacker Belt Assembly

The stacker belt assembly is quite novel. It is of heavy steel construction with the main frame riding on widely spaced heavy steel rails, and with the toe end near the tripper riding a third rail. The tripper is a part of the stacker assembly. The first mentioned rails are 100 lb. and are 20 ft. apart with individual rows of ties under each rail with the ties spaced conventional distances. Wooden 6- x 6-in. spreaders are used about every 20 ft. with a steel tie rod in between each timber to maintain proper rail gauge. The track for supporting the tripper is 583-ft. long. The main assembly is mounted on four heavy, flanged railroad car wheels with the two rear wheels both connected to the drive shaft so that the stacker can be moved longitudinal-

Showing irregular surface of quarry after overburden has been removed

ly as desired. The inclination or vertical lift of the belt is set. The belt is 125-ft. centers. The assembly is driven through a Jones speed reducer and electric motor under the control of the crusher operating crew. An electric cable reel, mounted on the main assembly, is driven through a small Foote reduction unit. By moving the stacker, a long windrow of stone can be stored. The stacker was made by Transall, Inc.

The surge or storage pile following the primary crusher is made up in three sections with a total length of approximately 650 ft. The center and larger section is for storage of high calcium limestone and at one end is a smaller pile for non-chemical and non-metallurgical stone, and at the other end is a pile for dirty rock. Under these piles is a reclaiming tunnel belt conveyor fed by eight Jeffrey-Traylor electrically - vibrated feeders. Four are of the grizzly type. Starting at the extreme back end (tail pulley end) of the reclaiming tunnel is a 36- x 72-in. vibrator unit that has an 18-in. long grizzly. Then follow two that are 30- x 70-in. with 22-in. grizzlies and four non-grizzly type in front, and a 48- x 108-in. grizzly is under the non-chemical stone. The grizzly bars are spaced on about 3-in. centers, and allow fine material to fall to the off-bearing belt conveyor ahead of the coarser fragments thereby helping to protect the belt .

Under the primary surge piles, the reclaiming tunnel is open at both ends and the top of the tunnel is about at ground elevation. An inclined ramp and steps are provided at each end of the tunnel. The walls of the tunnel are of concrete block with heavy steel "square-sets" spaced along the tunnel's length to insure adequate safety.

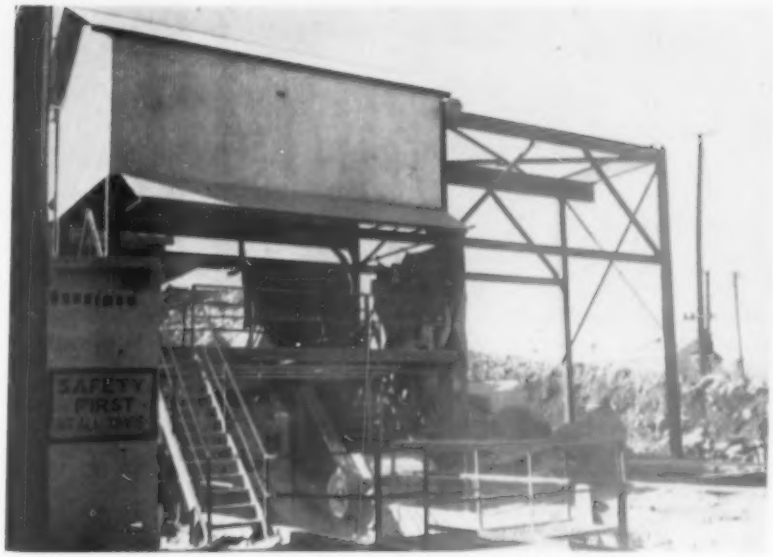
The tunnel is provided with a sump and a small Gould centrifugal pump to take care of any water that seeps into it. The belt conveyor operating in this tunnel is 42-in. wide and has a rated capacity of 400 t.p.h.

Screening and Washing

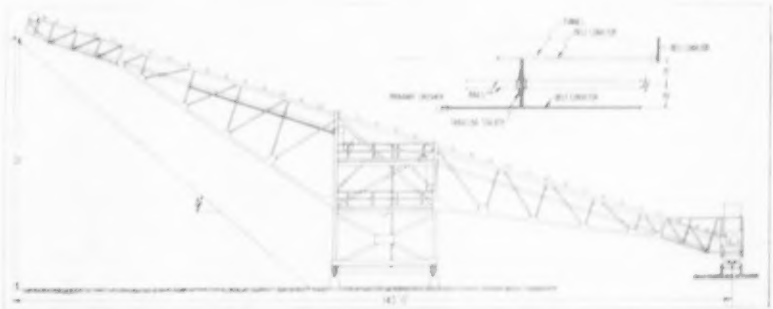
The first screening and washing operation is in Tower No. 1 where stone from the surge piles is sent over a 5- x 14-ft. Robins Gyrex two-deck screen. This screening operation and all subsequent to it are supplied with copious amounts of wash water to free the material of all clay. The top deck of this screen has 4-in. openings and a lower deck with 2-in. mesh. The plus stone falls to a 36- x 60-in. Jeffrey-Traylor electric vibrating feeder that places the coarse stone on a stacker belt. This feeder places the stone more gently on the belt than would be the case if it fell direct, thereby insuring a longer life for the belt. The minus 4-in. plus 2-in. stone goes to a 5½-ft. standard Symons cone crusher with a 2-in. C.S.S. The minus 2-in. stone passes to a 4- x 12-ft. Allis-Chalmers Ripl-flo, double-deck screen, operated wet. This screen is designed to spread out the finer material to give it more adequate washing. The fines from the lower deck go to the tailing disposal area. All other fractions from the screen join the throughs from the cone crusher and are elevated to screening Tower No. 2. Thus, it will be seen that the cone crusher here operates in open circuit.

Before going into a detailed description of the screening in tower No. 2, it might be well to point out that the plant produces two grades of stone; chemical (flux) and commercial. All

(Continued on page 94)



Primary crusher and building with platform for operator



Elevation and plan details of traveling stacker

Close-up of tripper which is part of the traveling stacker belt conveyor system

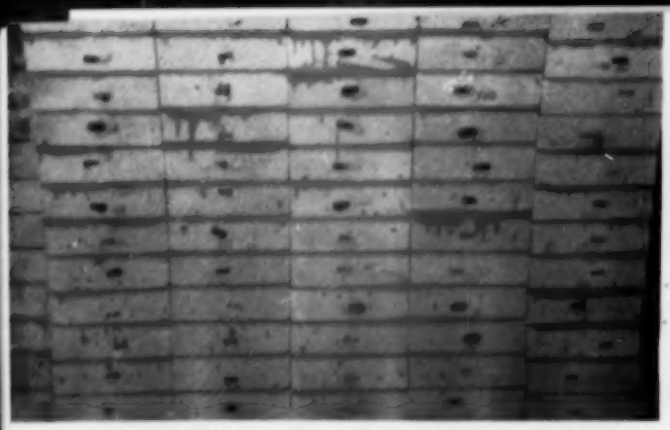


Fig. 13: Illustrating correct manner of laying up independent rows or circles of brick with bonding cement in only the radial joints of the kiln lining

Fig. 14: Bucket, left, contains cement of consistency suitable for ⅛-in. thick "spread" to be applied to kiln shell before receiving brick. Bucket, to the right, contains cement mixed to consistency suitable for making "dipped-joints"

Insulating FIREBRICK for Exposed Lining In Rotary Cement Kilns

CONCLUDING ARTICLE OF SERIES

. . . deals with recommended procedure for installation of kiln lining. Proper methods of laying brick and bonding are described

By **LEOPOLD TSCHIRKY***

NO KILN LINING MATERIAL, regardless of kind or grade, can be expected to render maximum service if not properly installed. Lining materials should be regarded and treated with the same respect as any other essential piece of equipment and are deserving of the same close attention and strict supervision when being installed as is given when such other equipment is installed. To do so will go far toward minimizing lining difficulties.

*General Refractories Co., Philadelphia, Penn.

Insulating firebrick lining should be laid up with the brick forming individual circles, as is shown in Fig. 13. There should be no bond between the brick in adjacent rows. The brick, however, should be solidly and tightly bonded in all of the radial joints (the joints falling in planes passing through the longitudinal axis of the kiln). Fig. 13 clearly illustrates the lack of bonding between adjacent rows and the tight brick to brick bond in the radial joints. It is *very important* that the bonding material for these radial joints be nothing other than the special air-setting cement furnished with the brick for that purpose, to which sufficient water has been added to give it good dipping consistency. About one gallon of water per 100 lb. of the cement as received should be sufficient.

Bricklaying should start at the lowest point in the kiln, but before any brick are set in place a thin layer of ⅛ in. thickness of the same aforementioned cement should be uniformly spread on the kiln shell over a relatively small area just ahead of where

Fig. 15: Two views show how ⅛-in. thickness of cement is applied to kiln shell before receiving brick and the specially equipped trowel used for the purpose

Fig. 16: Brickmason in the act of "dipping" a brick on one face

Fig. 17: The man to the left confines himself to applying ⅛-in. layer of cement over which brick are to be laid. Man to the right confines himself to laying brick

Fig. 18 Showing various steps in "keying" a kiln lining as shown below

Fig. 19: Reasonable protection against damage should be given completed sections of lining

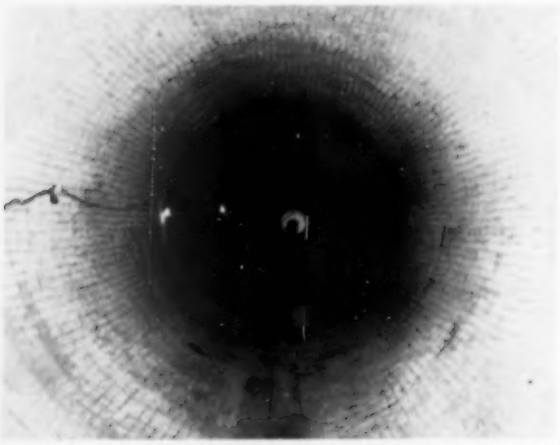


Fig. 20: Portion of nearly completed exposed insulating firebrick lining 217 ft. long in a 12-ft. diameter kiln

brick are to be laid. The consistency of the cement for this ⅛-in. thick spread should be such as will permit easy spreading and troweling but not so thin that any of the cement will "run" after being spread on the kiln shell. The consistency of a freshly opened can should be satisfactory for this purpose.

Fig. 14 shows two buckets of cement, the one to the left containing cement of consistency suitable for the ⅛ in. thick spread on the kiln shell, and the one to the right containing cement of consistency suitable for tight "dipped" radial joints.

Fig. 15 shows a workman applying the ⅛ in. thick spread of cement on the kiln shell. It also illustrates a tool by means of which one can be assured proper uniform thickness of the spread. Note that the tool is nothing other than a plasterer's trowel with ⅛ in. diameter wire wound around both ends.

Fig. 16 shows a workman in the act of "dipping" a brick, leaving only enough cement on the one surface to assure tight brick to brick bond throughout the entire radial joint. And Fig. 17 illustrates a bricklaying crew well organized to make speed, the man at the left confining himself to spreading a ⅛ in. thick layer of cement on the kiln shell over an area sufficient to receive one row of brick and the man at the right confining himself to laying brick.

As brick are set in place over the ⅛ in. thick spread, they should be solidly seated against the kiln shell by lightly tamping with a soft wooden or rawhide hammer, taking great care to squeeze out excess spread cement in such a manner that none of it will work its way into the radial joint to cause a partially open joint. The latter is *very important* and should be watched most carefully for if excess cement is permitted to enter the radial joint it will most likely result in spreading the brick apart at the shell side and cause pinching on the inside circle —a condition that must very definitely be avoided.

In other respects the lining procedure is quite the same as followed when laying up fireclay brick linings except that no grouting material should be applied after the brick are set in place. And of all the various methods that can be used to support unfinished sections of lining, the so-called "screw-jack method" is to be preferred. Only sufficient pressure should be exerted against the brick to safely hold the unfinished lining in place because, while insulating brick are strong, their cold crushing strength is considerably lower than that of conventional fireclay brick.

The matter of properly keying-in each row of brick is every bit as important, if not more so, than when installing a fireclay brick lining. The key brick should never be cut to less than two-thirds the chord dimensions of a full brick. They should be carefully measured and rubbed or cut to dimensions that will assure a good tight fit throughout the entire radial joints. For rubbing, a small rough emery stone will be found satisfactory, but if cutting is necessary that should be done with a saw and preferably with a power driven brick cutting saw. A proper fitting key brick should require a reasonable amount of pressure

(Continued on page 170)

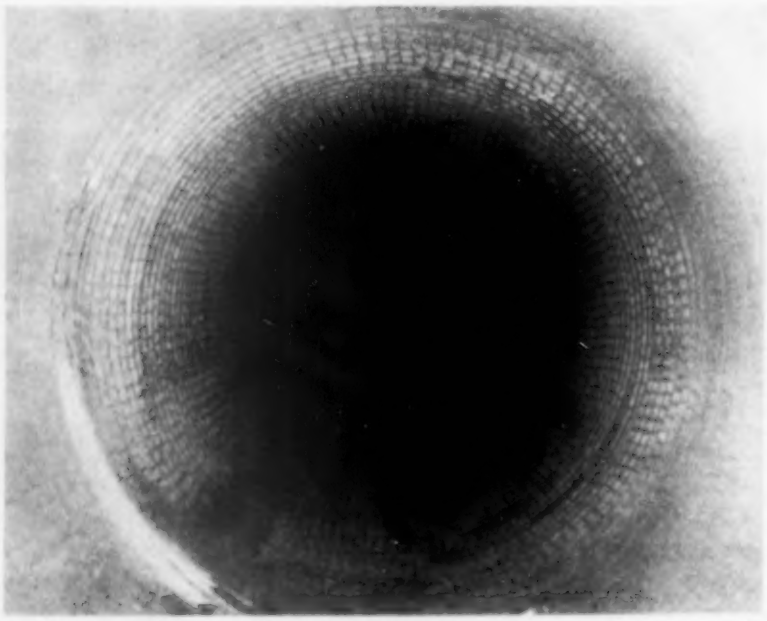


Fig. 21: A completed exposed insulating firebrick lining 167 ft. long in kiln 10 ft. dia.

Note the stringers of Stoody 21 which act as "buffers" between abrasive earth and bucket sides. Inside surfaces of bucket receive similar protection.

All Buckets Take a Beating... Here's the Medicine!

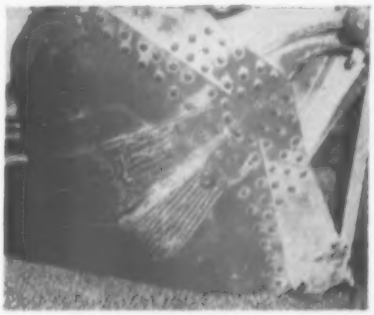
We're often asked about bucket maintenance, what hard-facing material to use and how to use it for maximum wear protection. Actually, your own equipment gives you part of the answer. Each bucket wears differently, depending upon how it is used and the kind of material handled. By watching for development of wear patterns, then hard-facing these areas at definite intervals, you'll get extended service with greatest economy. *Remember, a frequent touch-up is better than a major repair*...more economical in hard-metal and less costly in down time.

If buckets are severely worn, first build up with Stoody Manganese. For hard-facing, the alloy most commonly used is Stoody 21, preferred because of good wear resistance, fast deposition rate and low price. Occasionally, under conditions of excessive abrasion, Coated Tube Stoodite gives longer life on shovel teeth and reduces maintenance costs.

Full particulars on alloy recommendations and hard-facing procedures are in the Stoody HARD-FACING GUIDEBOOK. Ask your dealer for a copy (check the "yellow pages" of your phone book) or write direct.

Bucket teeth (top illustration) and adapters (above) are amply coated with Stoody 21. Hard-faced teeth on this job averaged two full shifts of extra service before needing additional hard-facing treatment.

These Stoody 21 beads across the bucket resist severe abrasion as it is dragged across rubble, returning for a new bite.



Lips on this clam shell are kept in good shape for a tight seal with Stoody 21.

Scoop lifts often lead a tough life. Here, lips, sides and bottoms are kept in good condition with Stoody 21. Occasional touch-ups are made as wear occurs.

STOODY COMPANY 11929 East Slauson Avenue, Whittier, California

"See the STOODY EXHIBIT-WELDING SHOW, Buffalo, N. Y., May 9-11."

Left to right: J. A. Carnathan, general superintendent; Wm. E. Hinkle, plant engineer; and J. H. Pigford, chief engineer

TWO PRODUCTS— SAME QUARRY

(Continued from page 89)

chemical stone, fine or coarse, is high calcium limestone, and all commercial stone can be either, or both, for the high calcium and the dolomitic limestones are of the highest quality and will pass any reasonable specifications. Thus, when fractional parts of a material from a deck of a screen are split into several fractions and blended in with other fractions, this necessarily must be done with restrictions, for obviously one cannot blend fine dolomitic limestone in with the smaller high calcium stone for high calcium uses.

Screening tower No. 2 houses a total of four vibrating screens, mounted in pairs above each other. The top screen receives a split feed so essentially there are two banks of screens, each bank containing two screens, with each screen in a bank operating in series. This permits a considerable amount of flexibility in preparing the different sizes of commercial stone that are stockpiled. The top screen in any one series of two screens has 2-in. mesh with 1¼-in. mesh on its lower deck. Any desired fraction of the plus 2-in. stone can go to a 5½-ft. short-head Symons cone crusher that is set to ⅞-in. C.S.S.* with the throughs returned to the first screen mentioned (two 5- x 14-ft. Telsmith Vibro-King double-deck units). If desired, a portion of the plus 2-in. can be bled into the 2-in. to 1¼-in. stone. The minus 2-in. plus 1¼-in., can be sent to one of three places; either to the 2-in. to 1¼-in. stockpile, to the short-head cone crusher for further reduction, or can be blended into the 2⅝-in to $\frac{3}{16}$-in. fluxstone. Thus it will be seen that the short-head cone crusher operates in closed circuit with the first Vibro-King screen, with the exception of any 2-in. bled out of the coarser fraction.

The minus 1¼-in. from the lower deck of the top screen goes to the screen with which it is operating in series and it is similar to the one above it, being a 5- x 12-ft. Telsmith Vibro-King double-deck unit. It has ½-in. and $\frac{3}{16}$-in. mesh on its decks, respectively. The material on the top deck can be sent to one of two places; either into the smaller sized fluxstone (2⅝- by $\frac{3}{16}$-in.), or to the No. 3 screening tower for further separation.

The minus ½-in. plus $\frac{3}{16}$-in. material from the top of the lower deck can be put into one or two places; either in with the smaller sized fluxstone (2⅝-in. to $\frac{3}{16}$-in.) or stockpiled as ½-in. to $\frac{3}{16}$-in. commercial stone. Throughs from the lower deck ($\frac{3}{16}$-in. mesh) flows to a settling tank to scalp out most of the water with the spigot material falling to a type DSFX, 5- x 28½-ft. single Dorr rake de-watering unit. The sand from the rake is moved by belt conveyor to its stockpile, and the overflow and that from the water-scalper is sent to the settling pond. This material will be later processed for agricultural limestone.

The No. 3 screen tower contains two 4- x 12-ft. Telsmith double-deck pulsators mounted in parallel. These screens have 1-in. and ¾-in. mesh decks, respectively, and produce three sizes of commercial stone that are all sent by belt conveyor to their respective stockpiles; 1¼-in. to 1-in., 1-in. to ¾-in., and ¾-in. to ½-in. These screens receive material (plus ½-in., minus 1¼-in.) from a conveyor or from No. 2 tower.

The flow diagram gives more details including approximate tonnages handled.

The stone that is classed as dirty

(Continued on page 206)

CONVEYOR SPECIFICATIONS

Conveyor No.	Belt Width	Belt Manufacturer	Length	Tonnage in TPAH	Motor HP	Motor RPM
1	36 in.	Goodrich	585 ft.	525	40	1800
2	36 in.	Goodrich	148 ft.	525	40	1800
3	42 in.	Goodrich	428 ft.	400	15	1800
4	36 in.	Qunker	194 ft.	410	40	1800
5	24 in.	Qunker	79 ft.	250	10	1800
6	30 in.	Qunker	158 ft.	200	15	1800
7	30 in.	Qunker	234 ft.	600	15	1800
8	24 in.	Qunker	143 ft.	200	15	1800
9	24 in.	Qunker	228 ft.	300	30	1800
10	24 in.	Qunker	84 ft.	300	15	1800
11	18 in.	Qunker	116 ft.	50	5	1200
12	18 in.	Qunker	104 ft.	150	7½	1800
13	24 in.	Qunker	77 ft.	200	7½	1800
14	18 in.	Goodrich	102 ft.	150	7½	1800
15	26 in.	U. S.	293 ft.	525	75	1800
16	36 in.	Manhattan	370 ft.	500	20	1800
17	24 in.	Goodrich	121 ft.	245	7½	1800
18	30 in.	Manhattan	22 ft.	300	5	1800
19	30 in.	Qunker	69 ft.	300	10	1800
20	30 in.	Qunker	122 ft.	400	10	1800
21	24 in.	U. S.	59 ft.	245	10	1800

In the foreground, to the right, is the No. 2 tower with its rake classifier, and to the extreme left is No. 3 tower

*C.S.S. refers to "close stone setting."

Joint luncheon of N.S. & G. and N.R.M.C. associations. Seated at the speakers' table, left to right, are the officers and directors: M. Eugene Sundt, E. Phil. Gemmer, Robt. Mitchell, John Murphy; Hon. Douglas McKay, Secretary of the Interior, speaker; Louis C. Schilling, Roy E. Weaver, John W. Roberts, F. F. Schouweiler, E. K. Davison, R. P. McKenrick, manufacturers' division; and A. C. Thomas, mixer manufacturers.

Exposition and Combined Conventions

N.S.&G.A. and N.R.M.C.A. Drew 6700 Registrants

• Sessions covered all subjects of immediate interest to producers. Exhibit largest in history

THERE WERE MORE THAN 6700 REGISTERED at the combined 40th annual convention of the National Sand and Gravel Association and the 26th annual convention of the National Ready Mixed Concrete Association, held February 13-16, in Chicago, Ill.

Attendance set an all-time record, reflecting the growth of the two industries, the value of the associations' programs and the great interest in the biennial exposition of equipment and supplies.

The exposition was held at the Chicago Coliseum, marking the first time that the show has been held outside the convention hotel. All sessions were at the Conrad Hilton hotel.

The decision to hold an outside show was made necessary since hotel facilities had become inadequate for the type of exposition desired which would display heavy, full-scale equipment. More than three times as much space as ever available before was provided at the Coliseum, yet the space was oversold by 20 percent 4½ months before the show.

This was an astounding display of machinery, with 115 exhibitors, and heavy machinery, including power shovels, batching plants, etc., placed on display. The exhibits were open for inspection each of the four convention days and for one full evening, and an entire half day was left free of convention sessions to permit as much time as possible for equipment inspection.

Convention Program

The convention program comprised eleven full sessions in a 3-day period, including three for sand and gravel producers, three for ready-mixed con-

(Continued on page 98)

John W. Murphy, outgoing president of N.S. & G.A., left **Douglas McKay,** Secretary of of the Interior; and **Louis C. Schilling,** outgoing president of N.R.M.C.A.

PEAK CAPACITY

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NEW BRAUNFELS, TEXAS,
LIME PLANT
UNITED STATES GYPSUM
COMPANY

General View of Plant Showing KVS 10′ x 150′ Kiln with Preheater Internal Recuperator and Preheater

KENNEDY PRODUCTS

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- Swing Jaw Crushers
- Tube Mills
- Ball & Rod Mills
- Vibrating Screens
- Rock Feeders
- Air Swept Tube Mills
- Rotary Kilns
- Coolers, Dryers
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- Belts, Conveyors
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...for New Braunfels, Texas plant of United States Gypsum Company

LIME PLANT PRODUCTION BEYOND RATED CAPACITY

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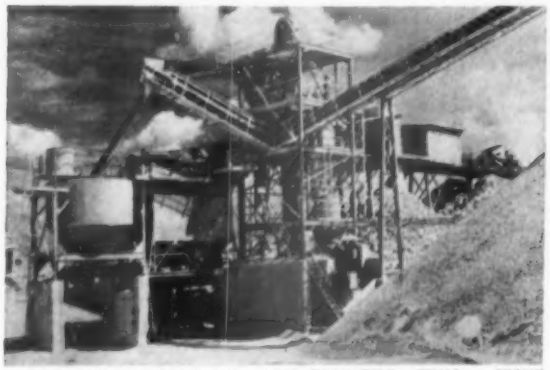
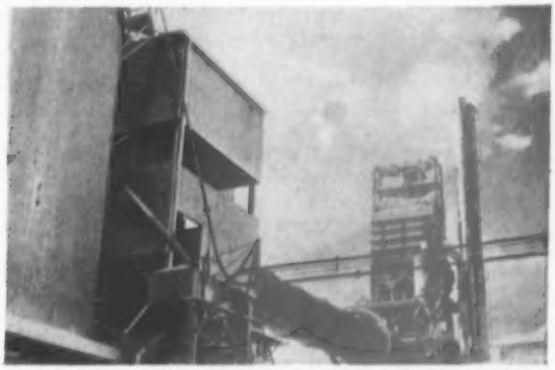
Machinery and equipment designed and furnished by KVS includes crushers, screens, conveyors, kilns, preheaters, deheaters. The installation also provides the latest automatic controls and special equipment that permits high temperature "aging lime" — important in achieving highest quality. Also, storage capacity at this plant has been almost tripled.

Whether your plant is large or small, old or new, Kennedy has the machinery and equipment for better products at lower cost. Let us prove . . . with operating facts . . . why KVS machinery is your best buy. Engineering consultation, anywhere, any time.



UNITED STATES GYPSUM CO., NEW BRAUNFELS, TEXAS — STONE PREPARATION PLANT COMPRISING KENNEDY 37½ S GEARLESS CRUSHER, KENNEDY AAA VIBRATING SCREEN AND KENNEDY BELT CONVEYORS



UNITED STATES GYPSUM CO., NEW BRAUNFELS, TEXAS — CLOSE-UP VIEW SHOWING INSTALLATION DETAILS OF KVS 10′ x 150′ ROTARY KILN, PREHEATER, RECUPERATOR AND DEHEATER

UNITED STATES GYPSUM CO., NEW BRAUNFELS, TEXAS — OVERALL VIEW OF STOCKPILE SHOWING OPERATION AND ARRANGEMENT OF CONVEYORS

New officers of the N.S. & G.A., left to right: E. K. Davison, secretary-treasurer; E. Phil Gemmer, vice-president; and Roy E. Weaver, president

crete producers, four joint sessions and a clinic for concrete producers on calculating proportions for concrete and methods of testing and sampling.

Subjects covered included public relations, zoning, sand classification, exploration, wear-resisting metals, aggregate specifications and safety in the sand and gravel sessions; and group insurance, labor relations, industrial radio, the Wage and Hour Law, group insurance, labor relations, taxes, Washington happenings and the highway program in joint sessions. Reports in this issue cover the sand and gravel sessions and some of the subjects presented in joint sessions. Others of the joint subjects and those specifically for ready-mixed concrete are published in *Concrete Products* section of this issue. Reports of the executive secretary and the director of engineering, mailed out to members at the time of the conventions, will be summarized in the May issue of ROCK PRODUCTS.

The regular sessions were preceded by two days of committee and subcommittee meetings, the annual meetings of the two boards of directors and a joint luncheon meeting of the two boards, and by a controllers conference and the annual meeting of state and area association officials.

Presiding Officers

Presiding officers for the separate sessions were president John W. Murphy of N.S.G.A., Louis P. Struble, Jr., and Charles E. Brady for the sand and gravel sessions; president Louis C. Schilling of N.R.M.C.A., M. Eugene Sundt and Robert C. Collins for the ready-mixed concrete sessions; and E. Phil Gemmer, Fred P. Curtis and Robert S. Barneyback for the joint sessions. Paul J. Kremer presided for the controllers' conference and Harold G. Feraud for the meeting of state and area association officials.

L. C. Schilling presided for a joint luncheon at which Secretary of the Interior Douglas McKay was the principal speaker. Other social activities were a hospitality hour and, for the ladies, a luncheon and style show.

Leon D. Collins and **F. J. Brugger,** Pacific Coast Aggregates, Inc., accepted the 1954 Class B safety award for the Fair Oaks plant

Safety

President John W. Murphy of N.S.G.A. presented the ROCK PRODUCTS safety trophies to the winning companies in the opening session. This year there were six trophies, three for the 1954 competition in collaboration with the U. S. Bureau of Mines, and three for 1955 as conducted by the N.S.G.A. In the future, there will be three awards based on a fiscal year compilation of the records.

Winners in the 1954 competition in the three classes were the Eagle Lake Plant, Texas Construction Material Co., Houston, Texas (class A); Fair Oaks Plant, Pacific Coast Aggregates, Inc., San Francisco, Calif. (class B); and the Fort Jefferson Plant, American Aggregates Corp., Greenville, Ohio (class C).

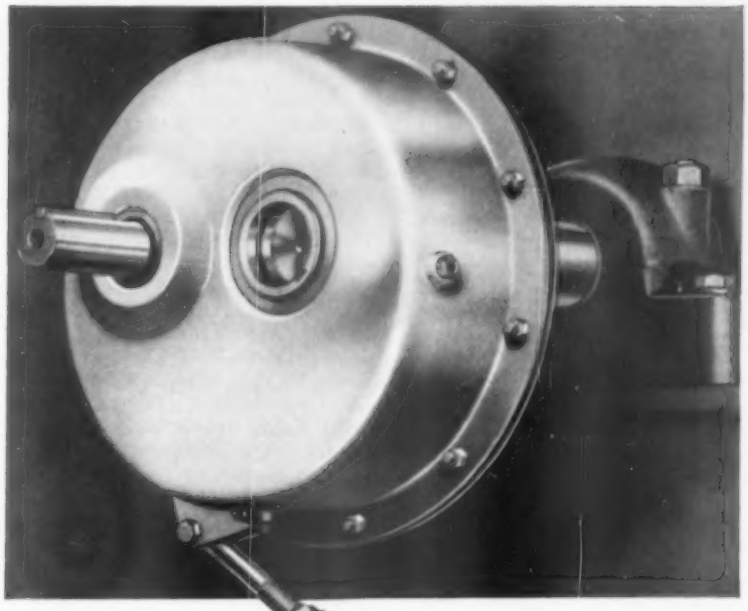
Winners in the 1955 contest were the Sun Valley Plant, Consolidated Rock Products Co., Los Angeles, Calif. (class A); Romayor Plant, Construction Material Co., Houston, Texas (class B); and the Lemon Cove Plant, Pacific Coast Aggregates, Inc., San Francisco, Calif. (class C).

(Continued on page 100)

Quentin W. Best, Consolidated Rock Products Co., accepted the 1955 Class A safety award for the Sun Valley, Calif., plant

M. G. Kerr and **R. S. Evans,** American Aggregates Corp., receiving the 1954 Class C safety award for its Fort Jefferson plant, Greenville, Ohio

Warren S. Brown, Pacific Coast Aggregates, Inc., received the 1955 Class C safety award for the Lemon Cove, Calif., plant



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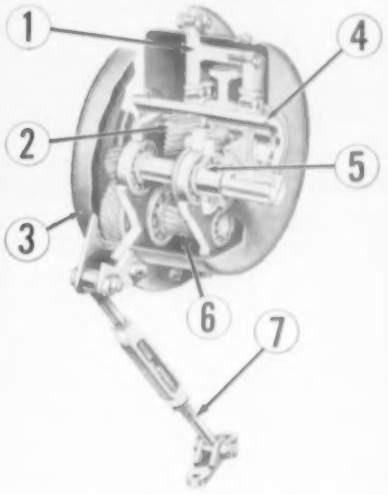

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Another view of exhibits showing producers talking to manufacturers' representatives

The boards of directors meetings were well attended. All but four members were present at the N.S.G.A. board meeting including seven past presidents. Similarly, there were all but four present at the N.R.M.C.A. meeting including 10 of 12 past presidents who could have been present.

The two boards presented Ezra C. Knowlton, Utah Sand and Gravel Products Corp., Salt Lake City, Utah, with a traveling bag in appreciation of his accomplishments in Washington while representing the two associations in matters of federal highway legislation.

It was announced in the board meetings that D. L. Bloem had been promoted to associate director of engineering for both associations and that Kenneth E. Tobin, Jr., had been promoted to associate executive secretary. E. Phil Gemmer is now chairman of the joint committee on safety and Howard Jordan will represent the associations in the National Highway Users Conference.

Future Meetings

Future annual conventions of the two associations will be held February 11-14, 1957, at Hotel Statler, Los Angeles, Calif.; February 9-13, 1958 at the Conrad Hilton hotel, Chicago, with the exposition at the Coliseum; and February 15-17, 1959, at the Roosevelt Hotel, New Orleans, La.

The 1956 mid-year board meeting is scheduled October 1-3 at Del Monte Lodge, Pebble Beach, Calif. Tentatively, the midyear meeting in 1957 will be August 25-31, at Manor Richelieu, Murray Bay, Canada, and the 1958 meeting is scheduled September 27-30 at the Lake Placid Club in New York State.

N.S.G.A. Officers

Roy E. Weaver, president, The Lincoln Sand and Gravel Co., Lincoln, Ill., was elected president of N.S.G.A. to succeed John W. Murphy. E. Phil Gemmer, Construction Material Co., Houston, Texas, was elected vice-president and E. K. Davison, J. K. Davison & Bro., Pittsburgh, Penn., was elected secretary-treasurer.

Completing the executive committee with the officers are H. E. Bender, Azusa Rock and Sand Co., Azusa, Calif.; J. Paul Calhoun, Consolidated Gravel Co., Columbus, Ga.; Howard W. Jordan, Metropolitan Sand and Gravel Corp., Port Washington, N. Y.; and Ezra C. Knowlton, Utah Sand and Gravel Products Corp.

E. Phil Gemmer and **Dudley E. Baker,** receiving the N.S. & G.A. winning Class B safety award for 1955, Texas Construction Material Co., Romayor plant

Members of the board of directors are as follows: Lockard J. Allen, Landers - Norblom - Christenson Co., Minneapolis, Minn.; C. A. Barinowski, Montgomery-Roquemore Gravel Co., Birmingham, Ala.; Robert S. Barneyback (member at large), Henry J. Kaiser Co., Oakland, Calif.; Fred E. Bellamy, Concrete Materials & Construction Co., Cedar Rapids, Iowa; Harold E. Bender, Azusa Rock and Sand Co., Azusa, Calif.; Theodore M. Bowers, Ohio Valley Sand Co., New Martinsville, W. Va.; Daniel J. Boylan, Boston Sand and Gravel Co., Cambridge, Mass.; Charles E. Brady (member at large), B. V. Hedrick Gravel and Sand Co., Lilesville, N. C.; Edmond F. Brovelli, Basalt Rock Co., Inc., Napa, Calif.; J. Paul Calhoun (member at large), Consolidated Gravel Co., Inc., Columbus, Ga.; C. A. Chipley, Fordyce Gravel Co., San Antonio, Texas; Jesse S. Cooper, Memphis Stone & Gravel Co., Memphis, Tenn.; Fred D. Coppock (honorary member) American Aggregates Corp., Greenville, Ohio; Irving Crown (member at large), Material Service Corp., Chicago, Ill.; Fred P. Curtis, Lyman-Richey Sand & Gravel Corp., Omaha, Neb.; E. K. Davison, J. K. Davison & Bro., Pittsburgh, Penn.; William J. Doyle, Jr., Tulsa Sand Co., Tulsa, Okla.; E. Phil Gemmer, Texas Construction Material Co., Houston, Texas; Enic A. Goodman, Jr., B. V. Hedrick Gravel & Sand Co., Lilesville, N. C.; James A. Hart, Chicago Gravel Co., Chicago, Ill.; C. R. Hartman, Klinker Sand & Gravel Co., Seattle, Wash.; Chester P. Hegan, Ohio River Sand Co., Inc., Louisville, Ky.; Wm. Edward Hole, American Aggregates Corp., Greenville, Ohio; Howard W. Jordan, Metropolitan Sand & Gravel Corp., Port Washington, N. Y.; Walter M. Keeler, The Walt Keeler Co., Inc., Wichita, Kan.; M. G. Kerr, American Aggregates Corp., Detroit, Mich.; R. D. Ketner (representative of Manufacturers Division), General Electric Co., Mate-

A scene of activity showing some of the larger types of equipment on exhibit

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rials Industries Div., Schenectady, N.Y.; Ezra C. Knowlton (member at large), Utah Sand and Gravel Products Corp., Salt Lake City, Utah; George R. Krom, The Windsor Building Supplies Co., Newburgh, N.Y.; C. B. Laird (representative of Manufacturers Division), Eagle Iron Works, Des Moines, Iowa; J. Henry Law, Western Indiana Gravel Co., Lafayette, Ind.; R. P. McKenrick (representative of Manufacturers Division), Blaw-Knox Construction Equipment Div., Mattoon, Ill.; Daniel J. Miller, Jr., North Jersey Quarry Co., Netcong, N.J.; James A. Murphy, Arizona Sand and Rock Co., Phoenix, Ariz.; Robert J. Potts (honorary member), Austin, Texas; Nathan C. Rockwood (honorary member), Naperville, Ill.; A. H. Smith, Branchville, Md.; Charles T. Turner, St. Francis Material Co., Forrest City, Ark.; Roy E. Weaver, The Lincoln Sand & Gravel Co., Lincoln, Ill.

President's Address

OPENING THE SESSIONS of the National Sand and Gravel Association, president John W. Murphy, outlined the convention program, summarized the work and accomplishments of the association, and mentioned some of the new activities underway or contemplated.

N.S.G.A. finances are in excellent shape, he said, and adequate reserves have been provided to finance any new endeavors which may be decided to be essential. Membership has grown steadily and now stands at an all-time high. In a five-year period, the increase has been 40 percent and the total membership is representative of 70 to 75 percent of the commercial production in the United States. This substantial gain has been accomplished without benefit of membership solicitors or a membership committee.

Mr. Murphy expressed his appreciation for having been privileged to serve as president these past two years, and was high in his praise for the work of the staff, and the cooperation of the officers, the board of directors and members. He also thanked the associated members for their interest and participation in association matters.

Touching upon activities of the past year, he commented on the value of the engineering short courses and mentioned that the annual allowance for the two association-sponsored fellowships have been increased. The public relations committee, appointed a year ago, has been very active during the year.

A survey of depreciation rates and practices has been completed and a report distributed to members. That committee is now engaged in a study of cost accounting practices. The taxation committee, under the chairmanship of J. Rutledge Hill, continues active in matters of tax developments and particularly percentage depletion. The association, under Mr. Hill's leadership, was given full credit for obtaining percentage depletion benefits for the industry.

Mr. Murphy urged that efforts by individual companies in accident prevention be increased in line with the association's continuing activities. He advocated more participation in the association's annual safety contest.

The quarterly wage survey, which has been expanded to also provide a semi-annual survey of "fringe benefits" paid by the industry, continues to be valuable in providing information for the guidance of members in negotiating labor contracts.

Mr. Murphy expressed his concern for the power of labor unions as based on their strength in numbers and their enormous financial reserves. The industry with its many small companies operating on a local level is face to face in labor negotiations with unions whose strength cannot be approached.

While most business men do not look with disfavor on unions as such and very often have high respect for local business agents and union officials with whom they come in contact, the problem is that vital decisions often come from the main offices of the union. The result is that local union officials may be forced into demands and actions against their wishes.

The balance of power has swung too much to the side of labor unions for small industry to be able to cope with it and, Mr. Murphy said, it is now time for the voting American public to insist through legislation that the might of unions be directed toward the welfare of the economy and the true laboring man.

He believes that unions should not be permitted to accumulate such tremendous financial strength when industry is not permitted to do likewise. Also, he believes that unions should be made to compete for members, whereby an individual would have the right to join or not join a union, to remain a member of a union or not to remain a member. Such laws might be enacted on a state basis in his opinion.

Secretary of Interior Points to Need for Conservation

Douglas McKay, Secretary, U. S. Department of Interior, was the guest speaker at the joint luncheon held on February 15. Mr. McKay referred to the sand and gravel and ready-mixed concrete industries as being vitally important to our Nation's economy.

The speaker also pointed out that conservation is becoming a matter of mutual concern. He said it is erroneous to consider the supply of sand and gravel as limitless. In many areas commercial reserves are either scarce and nearing exhaustion, or are becoming unavailable because of zoning restrictions.

In view of the elevation of the sand and gravel industry in 1954 to the largest segment of the mining industry in terms of unit production, Mr. McKay said those associated with the sand and gravel industry should be proud. Preliminary figures, he reported, indicate that production of sand and gravel in 1954 exceeded 500,000,000 tons, valued at almost a half-billion dollars, thus placing the industry ahead of bituminous coal. He remarked that if this quantity of sand and gravel were incorporated into a concrete road slab 24 ft. wide and 9 in. thick, that slab would be long

Luncheon for ladies attending N.S. & G.A. and N.R.M.C.A.

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enough to reach around the world four times. That same tonnage would build 43 dams the size of Grand Coulee.

The speaker also remarked that the operations of the ready-mixed concrete industry likewise are extremely impressive. It is estimated that about one-third of the sand and gravel produced is used in making ready-mixed concrete.

Mr. McKay also discussed the important role played by the industries in the Department's Bureau of Reclamation, which is currently working on 69 projects involving the building of large and small dams, powerhouses, canals, tunnels, etc. He indicated that a continuing reclamation program is of vital importance to our nation. He also cited important research being carried on in the Denver engineering center involving use of aggregates and concrete.

Mission 66 — a proposed 10-year program for rejuvenating our national park system, was also discussed. Mr. McKay pointed out that the industries will play a vital role in this project.

In closing, the Secretary told about a major Department activity involving establishment of a sound national water policy, aimed toward providing an adequate water supply in the future, preventing its waste, and providing for its useful and equitable distribution.

The President's Cabinet Committee on Water Resources Policy has made an exhaustive study of this problem, and has recently submitted a report to the President and Congress in which are embodied a number of recommendations. This study is of major importance to the sand and gravel industry.

Public Relations

THE SERVICE which the public relations committee plans to provide the membership was the subject of a lengthy paper, "Good Community Relationships for the Sand and Gravel Industry" by E. K. Davison, J. K. Davison and Bro., Pittsburgh, Penn. Mr. Davison is chairman of that committee which was appointed a year ago in recognition of the growing pressure on all industry to operate in a manner conforming to the public interest.

The committee considers four matters as falling in the area of the industry's contact with the general public. They are (1) zoning regulations, land use and rehabilitation, (2) stream and air pollution, (3) use of the public highways and (4) support of philanthropic and cultural public projects. Work will be concentrated on problems of zoning and land use and rehabilitation in 1956.

As a first step, the committee set out to determine the present and potential scope of land use regulations on the industry. Findings from a questionnaire sent the entire membership were summarized and many individual replies read, in Mr. Davison's paper.

A total of 122 companies, representing one-half the membership, returned the completed forms, representing returns on 198 plants operating in 39 states and Ontario, Canada.

Fifty percent of the plants replying are operating in areas which are subject to zoning regulations administered about half and half by local municipalities or townships and counties.

Sixty-one percent of the plants reported operation in rural areas and 35 percent of these areas are zoned. Twenty-seven percent of the plants reported operation in suburban areas, 67 percent of these areas being zoned; 12 percent of all plants reported operation in urban areas, 83 percent of which are zoned.

The proportion of zoned plants in suburban and urban areas was to be expected, said Mr. Davison, but he was surprised that so many rural plants appear to be zoned. This trend is certain to grow as the suburbs continue to expand away from the cities.

Of 98 plants reported in zoned areas, 30 percent have been subjected to zoning hearings, dating from 1943 to some presently in progress, with the great majority occurring since 1950. Eleven of these hearings resulted in the denial of full use of the property.

The reason why zoned plants were not subjected to hearings was likely because an operation was a non-conforming use, pre-dating zoning regulations, said Mr. Davison, and many were probably located in areas zoned for industrial use.

The speaker warned that the relatively few adverse zoning decisions is not indicative of the seriousness of the problem. He reminded members of a warning given four years ago by Wm. Edward Hole, American Aggregates Corp. Mr. Hole said, "Many sand and gravel producers with large reserve deposits have been lulled into an attitude of indifference toward the problem of zoning, believing that they could not be touched thereby because of the generally accepted doctrine of non-conforming uses. In simple language, this doctrine means that if the use to which your property is dedicated is not in conformity with the zoning plan adopted subsequent to the inception of such land use, then that non-conforming use may be continued until you voluntarily abandon it. It may come as a shocking surprise to learn that this doctrine of non-conforming uses is being openly and forcibly challenged!

Mr. Davison said that the survey confirmed statistically that in time all sand and gravel producers will have to learn to live with regulated land use.

Returns from 47 plants indicated that a program of land restoration was either in progress or definitely planned. Sixty-five percent of the plants reporting such action are doing so without legal compulsion.

Mr. Davison concluded his paper by reading some of the replies received, telling of types of complaints and action being taken.

An Alabama producer told of increasing complaints in regard to spillage of gravel on the city's streets. A Seattle, Wash., producer operates under an annual city permit under a performance bond for safety and rehabilitation. A Utah producer told of a number of things being done to improve neighbor relations including oil-surfaced roads, the discontinuance of night-time operations, screening out the plant area by vegetation and measures to reduce dust and noise.

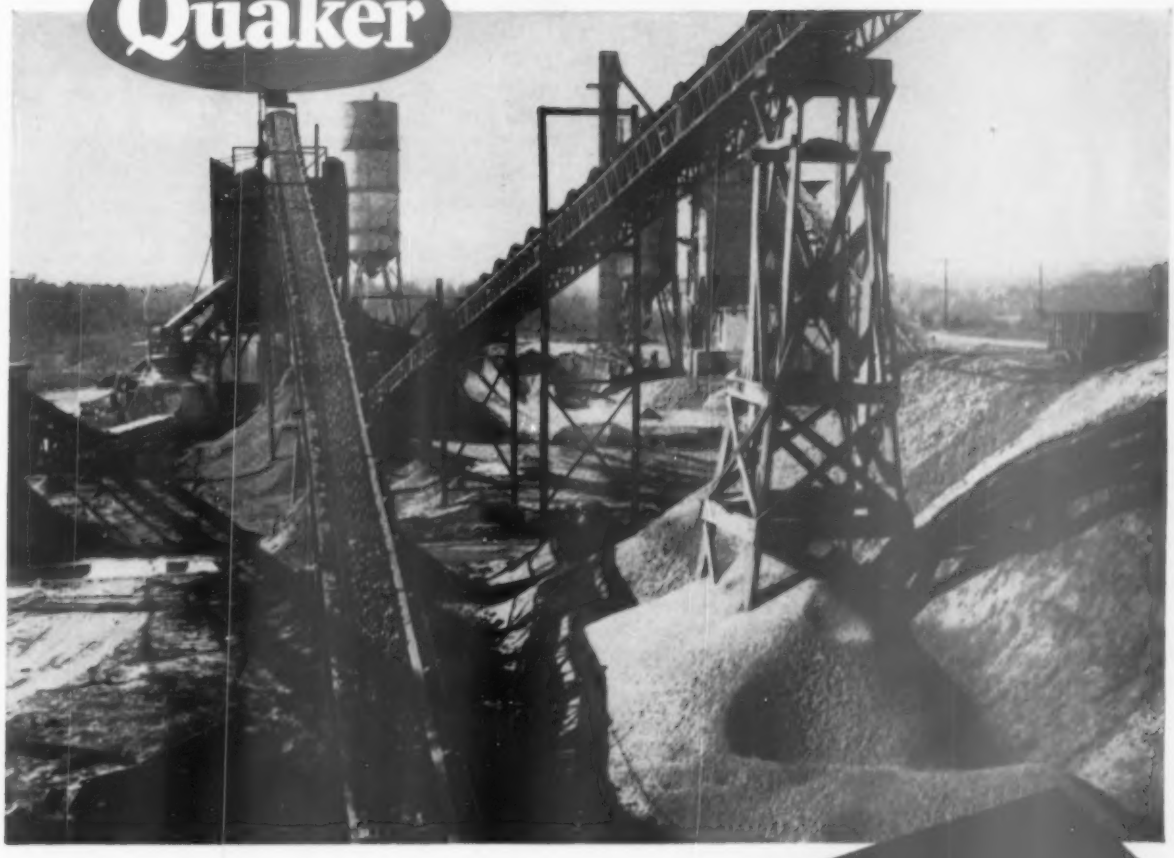
Others reported putting up fences to protect children, and many producers are back-filling and planting worked out areas, making artificial lakes, creating recreation areas and home-sites. Rehabilitation of worked out areas by producers in New York State is becoming a very serious problem. The sand and gravel, and related industries in the State are now threatened with legislation known as "the Town Law" which would give some 900 towns the right to impose restrictions, each in their own way, on the industry. Industries to be affected are pressing for State rather than town control.

The problem of spillage from trucks and the responsibility for resulting damage to on-coming traffic is becoming very serious among producers in New York State. Strong efforts are being made to control the loading of trucks.

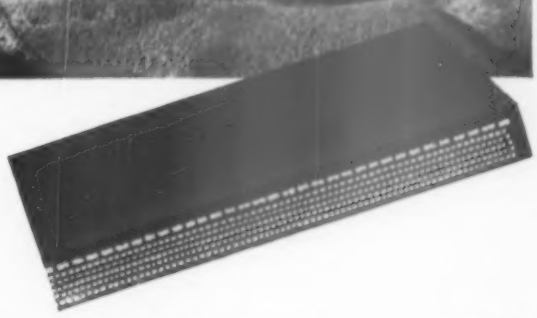
Many producers in the midwest agricultural states are leveling worked out areas and re-seeding with farm crops of value. An Illinois producer is planting evergreens on a buffer strip between his property and the adjoin-highway. A Nebraska producer has for many years sold excavated property to the State or private individuals for development as recreational areas.

A New Jersey producer has been working under sand and gravel ordinances for ten years, which require a license fee yearly and impose regula-

Quaker



Takes the impact and roughest abrasion of sharp, jagged loads



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No matter what you consider most important in a conveyor belt, there is a Quaker-Quaker Pioneer belt constructed to meet your need. This one, for instance, is especially made for tough shock resistance. Highly flexible, it is strong cotton duck, with average cover tensile strength 2500 to 3000 lbs. Skim coat between plies. For jobs requiring even greater troughability, tension resistance and flexing, Quaker can supply belts of new high tensile strength rayon or cotton-nylon fabrics of any desired cover thickness. Complete line offers industrial rubber products including hose, packing and moulded rubber for every use.

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H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

Philadelphia 24, Pa.

QUAKER PIONEER RUBBER DIVISION

San Francisco 7, California

Speakers at joint session, left to right: John T. Sapienza, counsel for the associations; Ezra C. Knowlton, Utah Sand & Gravel Corp.; and V. P. Ahearn, executive-secretary

tions as to grade and distance from roads. These ordinances have proved helpful. Increased highway traffic was the objection from neighbors that prevented 300 acres of land in Michigan from being re-zoned for gravel development. This same company paid much of the cost of paving about two miles of a country road over which it hauls. Water drainage from trucks is another source of complaint from the public, the solution being to provide proper loading facilities and drainage of the materials before loading.

Mention was made that sand and gravel lands have been reserved for the industry in the Los Angeles area. The foregoing are but a few of the points mentioned in some of the survey letters.

Having completed the first step, the public relations committee will now study the means of disseminating information on the importance of the industry to the nation's economy, seek to provide accounts of what is being successfully done to promote responsible operation and land restoration and work up suggested codes to cover the responsibilities and rights of producers. Application of this information, said Mr. Davison, will remain for the individual producer to work out in his own locality.

Providing Reserves

"Planning by Zoning Authorities for Development of Sand and Gravel Reserves" was the subject of a talk by Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif. Los Angeles County is unique in that city and county officials have set aside as sand and gravel lands areas which may only be mined for that purpose in order to insure adequate reserves of aggregates for the area.

Mr. Mitchell said that the population in Los Angeles County grew from 1¼ million in 1929 to 5¼ million in 1955, thus causing increasing difficulties as to land use. The area has two exceptional deposits of material, in the San Fernando and San Gabriel Valleys, with plants located on relatively cheap land along the dry washes. Over the years, some of this land has been taken over for industrial use and large flood control projects have taken over other good acreage, all of which is lost to production.

Mr. Mitchell reviewed the 1946 zoning case involving John Gregg (large producer) who had acquired land alongside his operations in the San Fernando Valley and wanted it zoned for sand and gravel. There was a wave of opposition but Mr. Gregg won his case after six weeks of trial. The case was appealed to a federal court and it took four more years before final ruling in favor of the producer.

This case focussed attention of the people on the fact that reserves were limited and that they might later have to go to the San Gabriel Valley for their supply of aggregates at greater expense. As a result the city council authorized a survey in recognition that sand and gravel were necessary and essential to the welfare of the city and that shortages must be prevented. It was desired to attain the highest and best use of land and to provide protection for the reserves, by setting up permanent sand and gravel districts.

The survey, mainly of the San Fernando Valley, resulted in amending the master zoning plan and a "G" gravel zone was provided in the law. The zone only included the particular properties, owned and operated and previously so designated, but it provides protection now against re-zoning.

The industry is impelled to do things like providing fencing, planting offsets, providing berms and limiting hours of operation, which, Mr. Mitchell believes the industry should have been doing anyhow.

There are 51 incorporated cities in Los Angeles County, which comprises the marketing area, and there are many unincorporated communities in which there are producing areas. It has been necessary to resist incorporation of these areas to prevent being subject to local ordinances. The county has a "Q" zone based on the same philosophy as the city zone.

A Stepped-Up Highway Program

EZRA C. KNOWLTON, executive vice-president, Utah Sand and Gravel Products Corp., Salt Lake City, Utah, presented a comprehensive report entitled "Adequate Highways for the United States." Referring to the stepped-up national highway program as the largest and most important ever considered by any legislative body in the world's history, he urged all members to assume leadership in their communities and give whole-hearted support to the program.

Mr. Knowlton's report was a follow-up of an address given at the association's Miami meeting in January, 1955. In that talk he traced the development of the national highway system since World War I, emphasizing the fact that in spite of the strenuous combined efforts of national, state and local governments, improvement of our vast highway network had never kept pace with the demands of a continually mounting traffic.

The subject matter of his Chicago talk was as follows:

(1) Enumeration of the important events which occurred during 1955, with emphasis upon the failure of Congress to adopt the highway program and important reasons for that failure;

(2) Presentation of the basic elements of the problem by means of slides; and

(3) Forecasts of future development, followed by a statement of suggested highway policy to be actively supported by the association members.

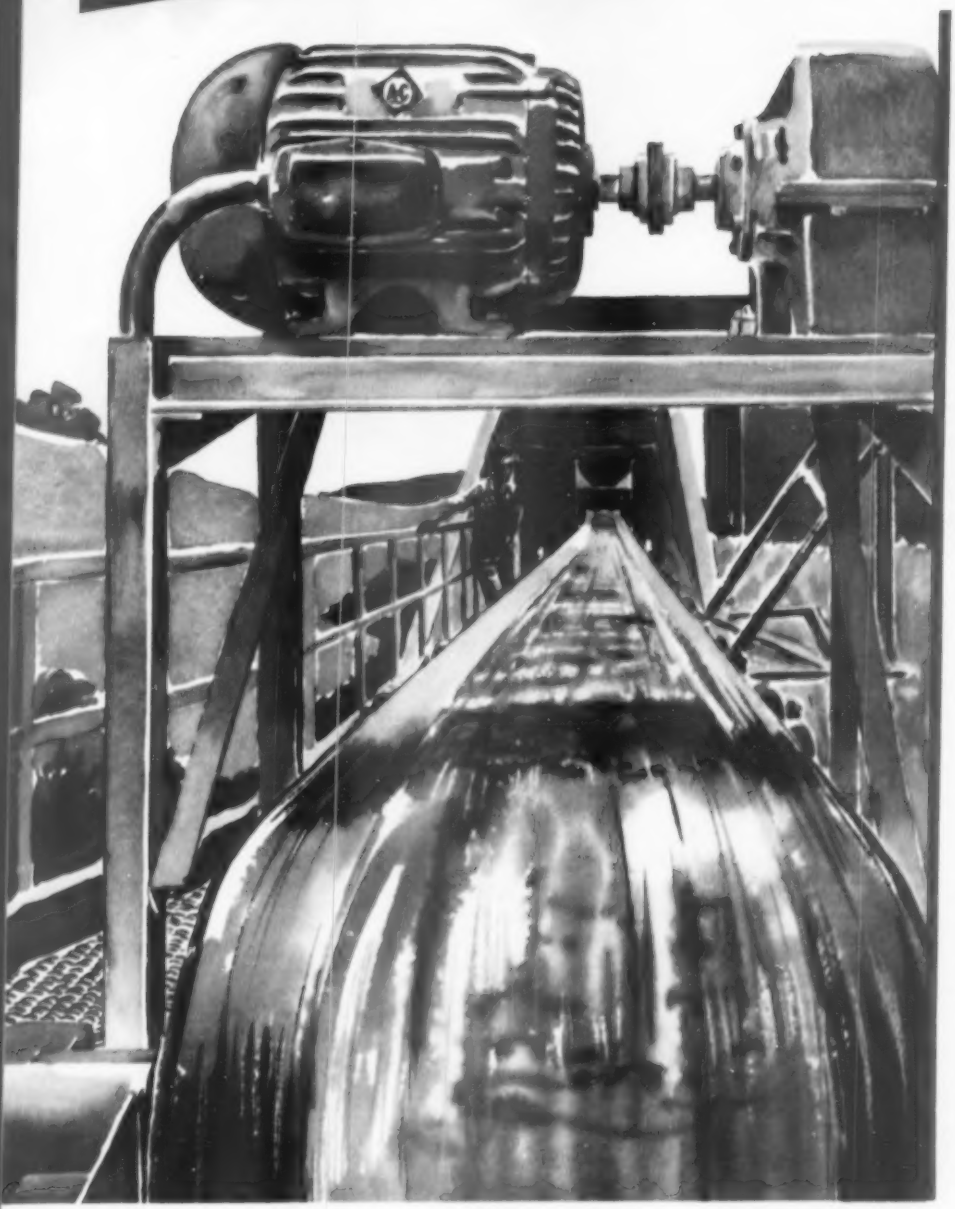
Under the first topic, the speaker referred to several bills brought before Congress in 1955, none of which were passed. Among the objections raised were invasions into the field of state sovereignty, writing into the bill financing provisions which would in effect bypass the House Ways and Means Committee, and a proposal for inequitable increases in Federal excise taxes of heavy trucks, buses, tires, etc., which would throw out of rela-

(Continued on page 134)

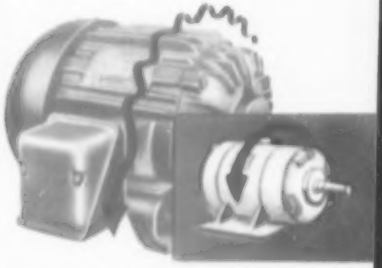
There's MORE

'Round-the-Calendar Operation

with Allis-Chalmers MOTORS



MORE IRON AND COPPER provide double protection against costly breakdowns. Liberal use of cast iron protects against frame distortion, and greater amount of copper increases electrical life.



MORE COOLING SURFACE of Allis-Chalmers deep-rib motors makes insulation burnouts highly improbable under normal conditions. There are no external enclosed air passages to become clogged.

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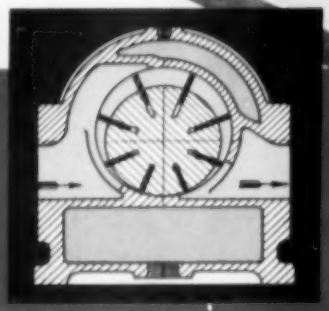

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You get MORE ADVANTAGES

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TYPE and SIZE for EVERY NEED

Both single and two-stage *Ro-Flo* compressors are available. Single-stage units for pressures to 50 pounds gauge, and volumes from 42 to 3245 cfm.

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Single and two-stage *Ro-Flo* vacuum pumps for vacuums to 0.3 inch mercury absolute, from 22 to 5950 cfm.

Call your nearest A-C office or write for bulletins 16B8244 (two stage) and 16B8126 (single stage). Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

1. **CONSTANT EFFICIENCY** — During operation the sliding vanes of the rotor press against the cylinder wall to form air cells. Even if these vanes wear, the rotating force holds them in contact with the cylinder wall so that efficiency and air flow never change.
2. **LOW-COST FOUNDATIONS** — Smooth rotation cuts vibration. This eliminates need for heavy foundations used with reciprocating-type units. Small units can be bolted directly to the floor. Large units need only a simple slab.
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Champs with a new power punch!

These Task-Force heavyweights pack the biggest power punch in Chevrolet truck history with a completely new Loadmaster V8 and revolutionary new Powermatic Drive!

Modern short-stroke V8's are standard in *all* new Task-Force L.C.F.'s and heavyweight haulers—with the big new 322-cu.-in. Loadmaster in top-tonnage L.C.F.'s and in other models rated up to 32,000 lbs. G.V.W. and 50,000 lbs. G.C.W.! It's Chevrolet's Taskmaster V8 in other heavy-duty models!

Get new Powermatic Drive, a 6-speed automatic specially built for heavy-duty jobs, for the most flexible and efficient application of engine power! Optional at extra cost in all conventional heavy- and most medium-duty trucks. See your Chevrolet dealer for details on the right model for your job! ... Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET **NEW CHEVROLET TASK·FORCE TRUCKS**

Anything less is an old-fashioned truck!

One of the many Barber-Greene BatchOmatic Asphalt Plants setting new low cost production records in the United States and Canada.

Now . . . two, four and six thousand pound Barber-Greene BatchOmatic plants

Less than a year ago Barber-Greene introduced the revolutionary BatchOmatic—the first plant ever designed from its original conception for completely automatic operation. In that short time the success of this batch plant has been established all over the United States and Canada. Owners and operators everywhere report that the automatic operation has reduced their costs, increased production and expanded their market. Inspectors find that the BatchOmatic consistently produces mixes to specification with automatic accuracy.

Now the Barber-Greene BatchOmatic is available in three sizes: two, four and six thousand pounds.

Now you can choose the capacity that best meets your needs and get the money-making design features that lead the field . . .

Simultaneous weighing of all sizes of aggregate . . . to eliminate the human element in achieving accuracy and maximum capacity.

Instant change-over from automatic to manual operation . . . to provide mixes for the drive-in trade . . . instantly reset to preset repetitive cycle operation.

New Dyna-Mix pugmill . . . to give more thorough coating in less time than any other pugmill.

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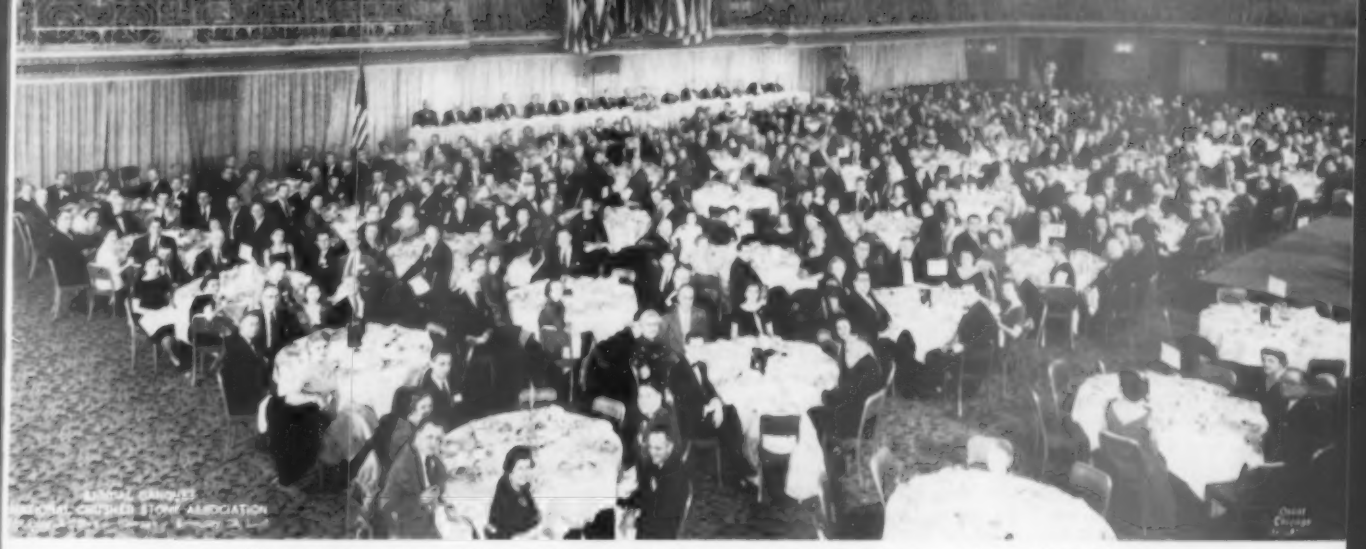


Annual banquet of the National Crushed Stone Association convention held at the Conrad Hilton Hotel, Chicago

OPERATING Problems—Research Stressed In Crushed Stone Convention

• Record-breaking National Crushed Stone Association attendance. Convention considers taxation, subrogation, legislation and safety. Exposition largest in history

REGISTRATION for the 39th annual convention and biennial exposition of the National Crushed Stone Association, held February 20-22 at the Conrad Hilton Hotel, Chicago, Ill., was about 1750, marking one of the association's most successful conventions in history.

This being the largest exposition to date with 71 exhibitors and a complete sell out, the convention program was tailored for maximum time to inspect the colorful display of machinery and supplies. There were four general convention sessions during the three days, allowing two half-days open so that all might have opportunity to inspect the exhibits.

In addition there was a full session for operating men and equipment manufacturers which provided opportunity for an exchange of ideas from the floor following presentations on timely production problems by a selected panel. George D. Lott, Jr., Columbia, S. C., presided over this meeting.

Other presiding officers were president T. C. Cooke, Swampscott, Mass., for the opening session and the annual banquet; R. S. Reigeluth, New Haven, Conn.; and Charles Coburn, Waukesha, Wis. Subjects covered in the operating session included rock breakage by explosives, developments in primary drilling, the operation of surge piles, problems of overloading and spillage on the highways, and the use of centralized controls, to increase plant efficiency.

N. E. Kelb, Cumberland Quarries, Inc., Indianapolis, Ind., new N.C.S.A. president, left, and **T. C. Cooke,** Lynn Sand & Stone Co., Swampscott, Mass., outgoing president

Other sessions heard the reports of the committees and staff, and discussions of highway legislation, technical developments in flexible pavements and concrete, percentage depletion and subrogation. The two morning sessions opened with presentation of two colored motion pictures. One was entitled "Road Block" through courtesy of Caterpillar Tractor Co. It featured the need for and requirements to get an accelerated highway program. This film is available without obligation for showings. The second film, "People, Products and Progress: 1975," by courtesy of the Chamber of Commerce of the United States, depicted life as it will be in this country in 1975 with contemplated developments.

A. J. Cayia, Manistique, Mich., presided for the Greeting Luncheon at which the N.C.S.A. Safety Contest awards were presented, and there was an entertaining talk by George A. Bowie, businessman and author of Michigan City, Ind. Houston Clinton, Burnet, Texas, presided for the annual

(Continued on page 114)

Lined with Lorain . . . for millions of tons at Universal Atlas' Northampton Plant

In 1943, when Universal Atlas opened its modern Northampton, Pa., plant, thirteen of the grinding mills were lined with USS Lorain rolled steel plate mill liners, and three of these mills still have the original liners. At Northampton experience has shown that no cast liner can withstand the tumbling of heavy media—4-inch grinding balls are used in wet primary grinding of raw material and in the primary clinker mills—like this tough, rolled and hardened steel lining.

In one of Northampton's 9′ 6″ primary, wet raw mills, a Lorain lining ground 1,932,548 tons of rock. A second Lorain lining in this mill ground out 1,858,595 tons. The present lining, installed last year, is a new type—a Lorain lining designed for the heaviest duty. Careful measurements of the wear so far and the plant's experience with this particular type liner in other mills indicate a conservative 2¼ million ton life and a lining cost, including labor, of only $2.71 per thousand tons ground.

USS Lorain linings give bonus-life service because they are made of tough, rolled steel—uniformly hot-worked and free of blow-holes or inclusions that are a frequent cause of breakage in castings. The lift bars are of heat treated alloy steel, hardened to resist abrasion and impact and to provide efficient lift even when the plates are worn to paper thinness. Every Lorain lining is designed to fit its mill precisely with a maximum of contact between lining and shell for good support. No backing or zincing is required.

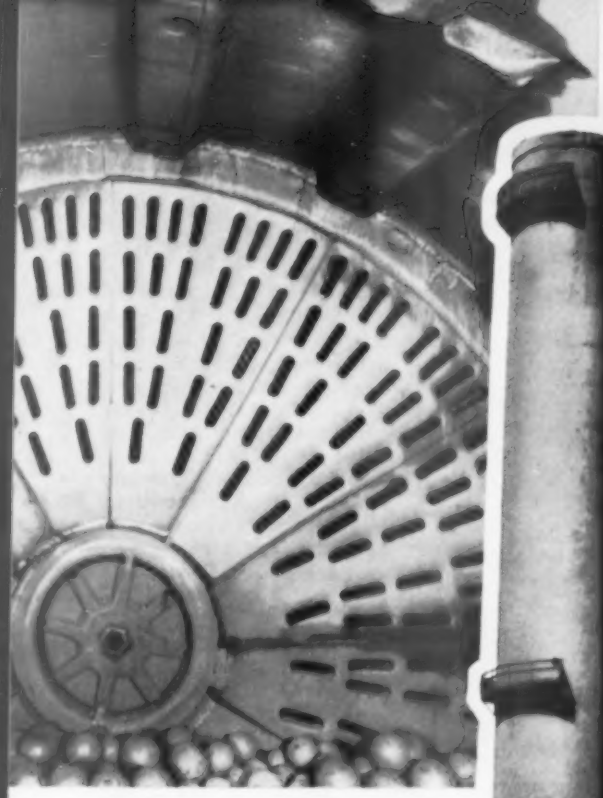
If you are in need of expert technical assistance on any grinding problem, write: Specialty Products Sales, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

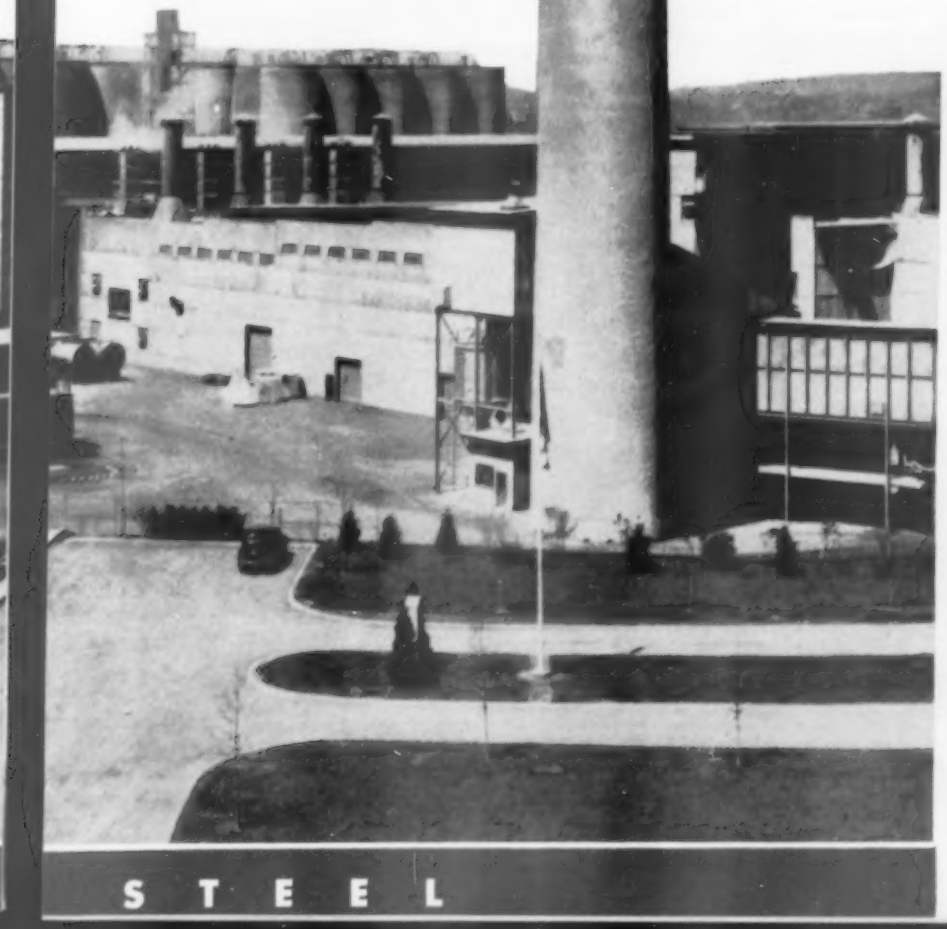
AN OVERALL VIEW of Universal Atlas Cement Company's Northampton plant. Here, Lorain Rolled Plate Linings are used for all phases of grinding.

UNITED STATES



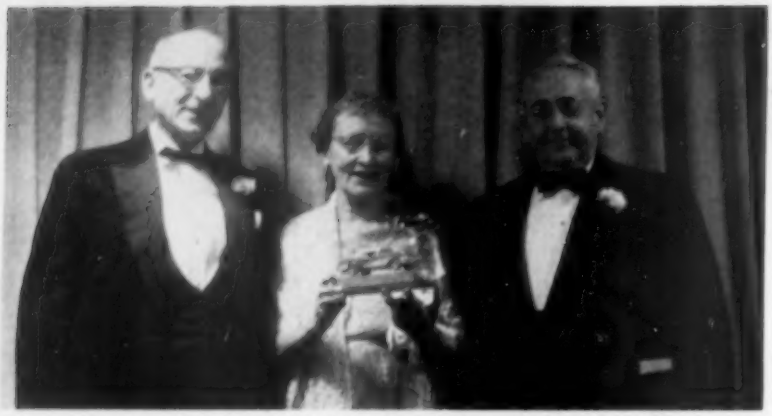
INTERIOR VIEW FACING DISCHARGE END of a 9′ 6″ secondary ball mill (wet process) at Universal Atlas' Northampton, Pa., plant. At time picture was taken this Lorain liner had ground 496,815 tons.

THIS IS AN INTERIOR VIEW OF THE FEED END of one of the grey clinker primary mills. 4-inch Lorain Grinding balls are used as make-up throughout. This lining has ground 1,836,688 barrels of clinker to date. As can be seen from the condition of the lining, wear is estimated to be under 20 per cent; several million more barrels will be ground before replacement is necessary.



THIS CROSS-SECTION drawing shows the heavy-duty type USS Lorain Lining used in primary grinding. This type lining has ground millions of tons of grey rock at Northampton at a liner cost—including labor—of $2.71 per thousand tons. White line on drawing indicates maximum wear profile.

S T E E L



Director of engineering, A. T. Goldbeck of N.C.S.A., left, with Mrs. Goldbeck and A. L. Worthen who presented a new automobile in behalf of the association to Mr. Goldbeck at a special ceremony in his honor at the annual banquet. Mr. Goldbeck is retiring as director of engineering in August, 1956, after many years of service, but will continue in an unofficial capacity to aid the association in engineering matters. Mrs. Goldbeck is holding a model of the new car which was presented

General Luncheon which was featured by a revealing talk "Report on Europe" by Eddy Gilmore, Associated Press Foreign Correspondent and former chief of AP's Moscow Bureau. The board of directors meeting of N.C.S.A. preceded the convention.

Social Events

The social side was outstanding and an excellent program was provided for the many ladies. They had special headquarters with a director of entertainment to assist with suggestions as to places of interest. Special events included a tea and sightseeing tour and luncheon through courtesy of N.C.-S.A. In addition, there were the two luncheons with big name speakers, the N.C.S.A. cabaret and the annual reception and banquet. Tom Collins, humorist and philosopher, presented a highly humorous and entertaining talk at the annual banquet.

Goldbeck Honored

A highlight of the annual banquet was An Appreciation to A. T. Goldbeck by past president A. L. Worthen. Mr. Goldbeck is retiring as engineering director in August, 1956, after more than 30 years of service but will continue to contribute his knowledge and effort thereafter in a more limited capacity.

Mr. Worthen told how Mr. Goldbeck had come to the N.C.S.A. in 1925 at the instigation of past-president Otho M. Graves, from his position as Chief, Bureau of Tests, U. S. Bureau of Public Roads. Much of the credit for the growth and prosperity of the association and the crushed stone industry was attributed by Mr. Worthen to Mr. Goldbeck's engineering and research accomplishments. Mrs. Goldbeck joined him at the head table where a presentation was made entitling Mr. Goldbeck to procure a Chrysler New Yorker automobile as a gift from the N.C.S.A.

Officers

Norman E. Kelb, president, Cumberland Quarries, Inc., Indianapolis, Ind., was elected president of N.C.S.A. James Savage, treasurer; J. R. Boyd, administrative director; A. T. Goldbeck, engineering director; and J. E. Gray, field engineer, were re-elected.

Elected to the executive committee, in addition to the president, were Russell Rarey, Columbus, Ohio, as the one member eligible to serve from the past presidents; O. E. Benson, Easton, Penn.; Wilson Foss III, New York, N.Y.; G. D. Lott, Jr., Columbia, S.C.; A. W. McThenia, Fort Spring, W. Va.; J. V. Owens, Utica, N. Y.; and Warren C. Rowe, Malden, Mass.

James Grove, M. J. Grove Lime Co., Frederick, Md., and P. V. Corey, Blue Rock Quarry, Cumberland Mills, Maine, were elected members at large to the board of directors. Margaret MacSmith, Lexington, Ky., was elected to the board in place of B. F. Taylor, Cowan, Tenn., resigned.

O. M. Stull, Liberty Limestone Corp., Buchanan, Va., was elected an honorary member of the board, and H. E. Rodes, Stirling Tomkins and Harold Williams were re-elected.

Future Conventions

The 1957 convention will be held the week of January 13 at four hotels on Miami Beach, Fla., and the 1958 convention and biennial exposition will be February 17-19 at the Conrad Hilton Hotel, Chicago, Ill.

The summer board meeting will be July 12-13, 1956, at the Lake Placid Club, New York, and for 1957 will be at the Homestead, Hot Springs, Va., July 11 and 12.

Manufacturers Division

The Manufacturers Division of N.C.-S.A. held a luncheon meeting to transact business and elect officers.

The Division now has 111 members, the highest total yet, and was successful in adding eight new members in 1955.

President T. C. Cooke of N.C.S.A. was present and he extended his congratulations to the Division for a fine exposition and its continued cooperation.

Wayne W. King, W. S. Tyler Co., was elected chairman to succeed B. R. Maloney. Elected vice-chairmen were H. W. Newton, Barber-Greene Co., W. A. Rundquist, Pioneer Engineering Works, Inc., and L. A. Eiben, Northern Blower Co.

F. E. Briber, Allis-Chalmers Manufacturing Co.; A. G. Crockett, Mack Motor Truck Corp.; L. L. Morgan, Caterpillar Tractor Co.; and H. H. Schaper, Smith Engineering Works, were newly elected to the board of directors. Wayne W. King, R. D. Ketner and B. R. Maloney represent the Manufacturers Division on the N.C.-S.A. board of directors.

Report on Europe

An enlightening "Report on Europe" was presented at the general luncheon by Eddy Gilmore, Associated Press foreign correspondent, former chief of

Officers and past chairman of Manufacturers' Division, N.C.S.A. Left to right: H. W. Newton, vice-chairman; Wm. A. Rundquist, vice-chairman; Wayne W. King, chairman; L. A. Eiben, vice-chairman; and B. R. Maloney, outgoing chairman

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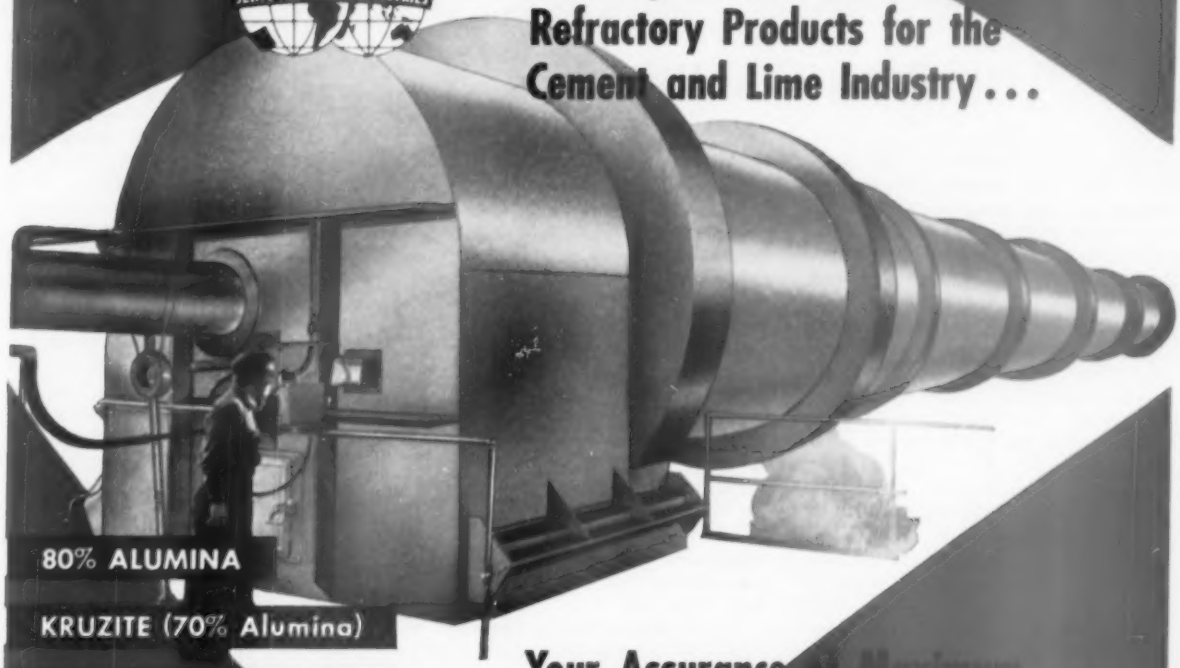
A Complete Line of Refractory Products for the Cement and Lime Industry . . .



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Your Assurance of Maximum Service at Lowest Cost . . . Regardless of the Operating Conditions in Your Plant

Operating conditions vary with each individual plant in the cement and lime industry. Burning temperatures, chemical composition of the charge and many other factors influence the selection of the proper refractory material for a given job.

For over forty years, the A. P. Green Fire Brick Company has been a leader in developing refractories to meet the exacting needs of the cement and lime industry. Your A. P. Green representative will provide the engineering experience and knowledge that, coupled with his complete line of A. P. Green Refractory Products, will give you a lining for maximum service at lowest cost.

Whatever your refractory problem or requirements, for specific recommendations without obligation to you, contact your local A. P. Green representative. You'll find him listed in the yellow pages of your telephone directory or write:

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REFRACTORY PRODUCTS

DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

AP's Moscow Bureau. Mr. Gilmore gave intimate glimpses into life behind the Iron Curtain. He contended that in spite of recent changes in leadership, Russia still has the prime objective of eventually dominating the world. A recent significant development, he pointed out, concerns Kruschev's disavowing Stalin's boast that the U. S. will soon experience a major depression and ultimately collapse. This switch in policy is to weaken the U. S. in various parts of the world, and to hope that we overspend overseas.

The featured speaker at the Greeting Luncheon was George A. Bowie, businessman, author, Michigan City, Ind., whose address was entitled "Let's Get Personal."

Business Conditions

CRUSHED STONE BUSINESS was good in 1955 and the prospects are excellent for 1956, according to the summary of reports of the regional vice-presidents. There are seven regions for which reports were compiled, and Canada.

The regions are New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont); Eastern (Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania); Central (Kentucky, Ohio, Tennessee and West Virginia); Southeastern (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina and Virginia); Northern (Michigan, Minnesota, Montana, Nebraska, North Dakota, South Dakota and Wisconsin); Midwestern (Illinois, Indiana, Iowa, Kansas and Missouri); and Southwestern (Arizona, Arkansas, Louisiana, New Mexico, Oklahoma and Texas).

All regions with one exception reported an increase in volume during 1955 compared with 1954. The highest increase was 12.5 percent in New England. Other increases reported were 3 percent (Eastern), 3 percent (Southeastern), 6 percent (Northern), and 7 percent (Midwestern). The Central region and Canada reported "up" and the Southwestern area had a decline of 21 percent.

There were price increases of 5 percent (Midwestern), 3 percent (Northern), 2 percent (Eastern) and 1.5 percent (Southwestern). Prices held the same in the New England region and in Canada. There was an increase in the Central region and a decrease in the Southeastern region.

The relation of volume of demand to capacity in 1955 was fairly uniform over the country, ranging between 80 and 90 percent.

As to distribution (percentage) of business, the figures varied widely. New England reported 73 percent highway construction, 6 percent railroad ballast and 16 percent for building construction. The Eastern region was also high in highway construction with 74 percent. Fourteen percent was for building construction, five percent agricultural limestone and three percent railroad ballast.

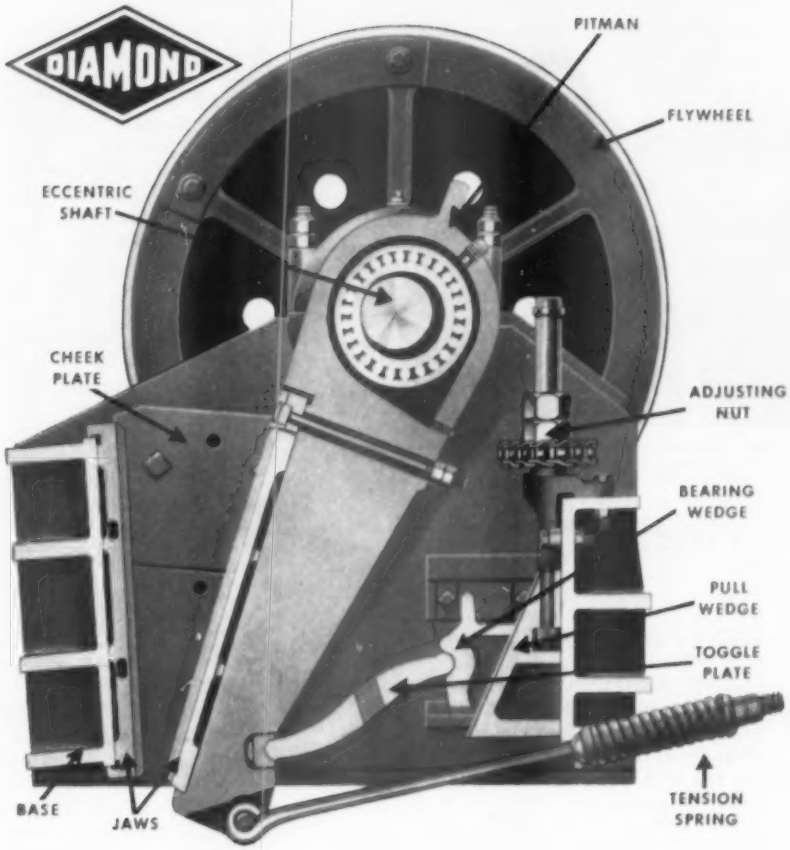
Distribution for the central region was 42 percent highway construction, 18 percent building construction, 22 percent chemical and metallurgical and 10 percent agricultural limestone. Almost all the tonnage in the Southeastern region was divided into three categories. There was 48 percent highway, 13 percent railroad ballast and 33 percent building construction.

The Northern region had 60 percent chemical and metallurgical and 30 percent for highways. Principal divisions in the midwestern region were 48 percent highways, 29 percent building construction and 15 percent agricultural limestone. In the Southwest, the division was 55 percent highways, 22 percent railroad ballast and 20 percent chemical and metallurgical. Canadian producers shipped 48 percent for highways, 30 percent chemical and metallurgical, and 15 percent for building construction. Only the Southwestern region expects much change from this distribution in 1956.

All regions and Canada predicted "good" or "excellent" prospects for business in 1956. Four regions and Canada expect increased volume and the others expect the same volume as in 1955. All but the Central region reported that additional aggregate capacity had been added in 1955. New plant activity was added in New England and in all other regions but Eastern where modernization was credited with the increased capacity.

(Continued on page 118)

New Board of Directors, Manufacturers' Division, N.C.S.A. Top row, left to right: J. W. Hardesty, Baldwin-Lima-Hamilton Corp.; C. S. Weber, Thew Shovel Co.; C. D. Smith, Joy Mfg. Co.; H. M. Albers, Kensington Steel Co.; J. M. Hume, Pettibone-Mulliken Corp.; G. Keppel, Birdsboro-Buchanan Crusher Div. Middle row: W. Collins, Atlas Powder Co.; F. Briber, Jr., Allis-Chalmers Mfg. Co.; R. Wells, Stephens-Adamson Mfg. Co.; F. A. Pampel, Chain Belt Co.; H. R. Harrington, Goodyear Tire & Rubber Co.; G. D. Fraunfelder, Easton Car & Construction Co.; E. T. Eggers, American Steel & Wire Div. Bottom row, left to right: G. C. Holton, American Cyanamid Co.; J. R. Boyd, administrative director, N.C.S.A.; H. W. Newton, Barber-Greene Co., vice-chairman; L. A. Eiben, Northern Blower Co., vice-chairman; Wayne King, W. S. Tyler Co., chairman; Mrs. E. S. Gill, Gill Rock Drill Co.; B. R. Maloney, E. I. du Pont de Nemours & Co., outgoing chairman; and W. A. Rundquist, Pioneer Engineering Works, vice-chairman



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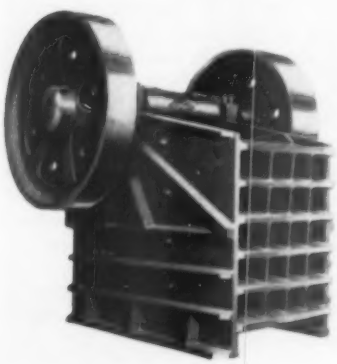

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Association officials, left to right: A. T. Goldbeck, engineering director; J. R. Boyd, administrative director; and Richard M. Prewitt, assistant administrative director

Engineering Director's Report

A. T. Goldbeck, engineering director, entitled his annual report, "The Past Thirty Years," this being his last report as an engineering director after 30 years of service with the N.C.S.A. Mr. Goldbeck is retiring as engineering director in August, 1956, but will continue to provide the association with the benefit of his services and advice in a more limited capacity.

Appropriately, he reviewed some of the more important engineering activities over the years which have contributed to the acceptance of crushed stone as an aggregate and to the solution of major problems.

In the field of concrete research, he traced some of the developments since 30 years ago when the proportioning of concrete by arbitrary proportions, such as 1:2:4, was still in vogue. It mattered not then whether rounded gravel or angular crushed stone was used, neither did it matter what the gradation and maximum size was to be or whether the sand was wet or dry. Thus, contractors had difficulty getting workable concrete with crushed stone.

It was not realized that moist sand sometimes had 30 percent more volume than dry sand and that arbitrary proportions resulted in concrete with far too little sand, which resulted in harsh working properties. This resulted in N.C.S.A. Bulletin No. 1 entitled "The Bulking of Sand and Its Effect on Concrete" which proved very helpful to member companies.

Growing use of the water-cement ratio specification presented difficulty because that relationship is disturbed by differences in cement and in surface characteristics of the aggregates as well as other influences not taken into account. This specification penalized crushed stone over the years by requiring more cement in crushed stone concrete than in gravel concrete.

A number of tests followed aimed at more realistic proportioning for highways, resulting in Bulletin No. 7 which showed that for like cement factor, crushed stone concrete often tested higher in beam strength than gravel concrete. The bulletin described a method for the design of concrete having any desired modulus of rupture, and established the beam test as a most suitable test for highway concrete.

Cooperative and unbiased tests with the Bureau of Public Roads and highway departments followed, using different and competitive aggregates, with the National Sand and Gravel Association participating.

As a result of these tests and continuing laboratory work, Bulletin No. 11 entitled "A Method for Proportioning Concrete for Strength, Workability, and Durability" was published. This method takes into account almost all the variation to be found in aggregates and is accomplished simply. This bulletin as finally revised in 1953, has been widely accepted and the method described does not penalize either crushed stone or gravel because both are required to have the same cement factor.

Shortly before World War II, work was started in developing information on the design of airport runways for carrying heavy wheel loads. The question to be answered was how thick should the runways be when using bituminous concrete. A special soil pressure measuring cell was devised which proved useful in tests for flexible pavement design. This work has been described before the Highway Research Board in several *Crushed Stone Journal* articles.

Among very early studies made in the field of bituminous concrete included proportioning, stripping of asphalt from the aggregate, stability, durability and the effects of different kinds of dust filler. In connection with these studies, the special test track was built in the laboratory in order to simulate severe behavoir. All manner of studies have been made with this apparatus.

Among the more important aggregate studies have been work on stone dust and its effect on concrete, the effect of flat and elongated pieces, studies of the sodium and magnesium sulfate tests, the prevention of segregation of aggregates, studies of the bearing value of railroad ballast, and the use of stone sand for concrete structures. The latter required devising a special test for determining particle shape.

A recent series of tests have been concerned with the problem of pavement slipperiness, using the circular track and other methods to develop data on a problem of growing importance.

(Continued on page 120)

Speakers at final session. Left to right: Warren C. Rowe, chairman, Subrogation Committee, Rowe Contracting Co.; R. S. Reigeluth, New Haven Trap Rock Co., presiding; and Donald D. Dagler, district engineer, Asphalt Institute, Harrisburg, Penn.

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Delegation from New York Trap Rock Corp. attending N.C.S.A. convention. Seated, left to right: Edward Sullivan, superintendent, Haverstraw plant; Melvin Dow, chief engineer; John Jorgensen, superintendent, Tomkins Cove plant; Henry Schwellenbach, assistant superintendent, Clinton Point plant; Michael Trojan, personnel and labor relations department; Geo. Foster, superintendent West Nyack plant; and Wm. Ferguson, drilling superintendent. Standing, left to right: Robert Mead, assistant superintendent, Haverstraw plant; John Kringle, assistant vice-president of operations; Clarence Stetser, general superintendent; Lou Miller, chief electrician; Andrew Komonchak, director of personnel and labor relations; Seymour Fleming, safety director; Gerald Boyle, vice-president, sales; Geo. White, superintendent, Clinton Point plant; Alan Winslow, staff assistant, community relations; and Floyd Buffington, vice-president, operations

In the past seven years alone, 252 research projects have been conducted, one requiring 12,000 separate determinations, and some 300 articles and bulletins have been published and numerous laboratory reports prepared. Six short courses have been conducted.

In conclusion, Mr. Goldbeck paid high tribute to the entire staff and urged that they be given support in future endeavors. He expressed the hope that he may be able to help the Association in the future.

Field Engineer's Report

Field engineer J. E. Gray had a prepared report summarizing his activities from which he deviated somewhat in discussing particular problems.

Mr. Gray and administrative director J. R. Boyd made a lengthy trip late in 1955 into the midwestern states to explore the kind of service producers desired, to ascertain first hand the difficulties encountered and for the purpose of determining how the services of the association might possibly be improved.

His written report covered the flexural strength of concrete which requirement is difficult to meet, and the subject of stabilized aggregate base construction.

He spoke at length on the subject of slipperiness of pavements which is a highway problem of serious proportions. Characteristics of the aggregate as well as the properties of the mix are claimed to be the primary contributors to this condition.

The rejection of an aggregate may solve one phase of the problem, said Mr. Gray, but creates a bigger one on cost. Researches conducted by the Virginia Council of Highway Investigation and Research over the past ten years have resulted in a progress report and data presented before the Highway Research Board were pointed to as offering a solution that may be practical.

This report presents data that indicate that a particular characteristic of the aggregate is the primary source of the trouble, which is its tendency to readily wear smooth and polish. It is reported that roads of the highest skid resistance are of the sand asphalt type in the Coastal Plain section of Virginia.

An experimental road has been built in which one of the most promising sections consists of using an aggregate of poor skid resistance for the bituminous concrete courses and then placing a ¼-in. overlay of silica sand asphalt for the surface course.

This sand asphalt mix was composed of 2½ percent hydrated lime, 6 percent asphalt and 92½ percent of fine silica sand. A bituminous paver placed the mix.

The report was in agreement with the association's studies. Mr. Gray invited producers confronted with this problem to call upon the association for engineering service, it being set up to reproduce and study "slippery" surfaces in the laboratory.

Mr. Gray pointed out that all limestones do not have slippery characteristics and that hard limestones are not necessarily good or bad. He showed charts compiled from the Virginia studies which indicated lowest skidding with granite and sand and gravel aggregate. The number of accidents from skidding in Virginia is higher in the limestone areas of the state.

Speaking more generally on the subject of thin sand asphalt surfaces, he said that many failures result because of difficulties in proper laying. Stone sand could be used to advantage in such surfaces, said Mr. Gray.

Administrative Director's Report

Administrative director J. R. Boyd briefly summarized the work of his office through the past year and touched upon some of the problems of greatest concern to the industry.

The association has become increasingly concerned with the increasing costs of railroad transportation, which have continued to force more of the tonnage of crushed stone to other forms of delivery. Mr. Boyd's office has been very active in resisting freight rate increases.

The association protested Ex Parte 175 providing for an increase of 15 percent in rates across-the-board and the industry wound up with a 12 percent increase. A brief has been filed in opposition to the 7 percent blanket increase now sought in Ex Parte 196.

Mr. Boyd said that consideration is being given to revising the association cost accounting manual because it does not reflect recent changes in the tax laws. The industry is to be questionnaired on this matter. The *News Bulletin* has resumed publication and will be continued. Mr. Boyd concluded by expressing thanks to A. L. Worthen, chairman of the conven-

Views of the large and varied exhibits displayed as part of the N.C.S.A. annual convention at the Conrad-Hilton Hotel in Chicago

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N.C.S.A. safety award winners and officials who received the awards. Bottom row, left to right: Verne C. Morgan, Kentucky Stone Co., for Yellow Rock, Tyrone, High Bridge (mines) and Elkton quarry; E. L. Brantley, Greystone Granite Quarries; H. C. Burgess, Woodleaf quarry, Superior Stone Co.; R. C. Williams, Red Hill quarry, Superior Stone Co.; Emil Berry, Avoca quarry, Jefferson County Stone Co.; G. C. Larkin, Kimballton mine, Standard Lime & Stone Co.; A. W. Zimmer, Cape Girardeau quarry, Federal Materials Co.; and W. F. Wise, Plant No. 4 quarry, Southwest Stone Co. Top row, left to right: Wm. M. Smith, Bell Mine, Bellefonte Div., Warner Co., top winner; Geo. Purnell, Jr., Cedar Hollow quarry, Warner Co.; Jesse Haney, Prospect Stone Plant No. 6, Eastern Rock Products Co.; Earl K. Pflasterer, Columbia Quarry Co.; No. 7 quarry; E. Z. Cole, Rock Hill quarry, General Crushed Stone Co.; Oliver C. Dietschler, Jordanville quarry, General Crushed Stone Co.; John P. Cox, General Crushed Stone Co., Watertown quarry; and Robt. D. Brewer, New Haven Trap Rock Co., North Branford No. 7 quarry

tion program committee, and by introducing Richard M. Prewitt, new assistant to the administrative director.

Accident Prevention Report

H. H. Kirwin, chairman, accident prevention committee, reported that 1955 was a good year safetywise for the membership. The 55 firms (96 plants) reporting to the committee experienced one fatality (by electrocution), 5 permanent partials, and 172 temporary injuries. Twenty-nine plants had accident free records. Mr. Kirwin also discussed a tentative association proposal for hiring a full time safety engineer; he said a questionnaire on the matter would be circulated to the membership in March. He urged greater participation in future safety contests; in 1955, only 40 percent of the membership submitted reports.

Chart showing quarries with no-lost-time accidents in 1954, winners in the N.C.S.A. safety contest

Safety Awards

THE 21 WINNERS in the 1954 N.C.S.A. safety contest, which is conducted each year by the Bureau of Mines, were feted at the Greeting Luncheon. H. H. Kirwin presented each company with an award provided by *Explosives Engineer* magazine.

Winner of the bronze trophy was the Bell Mine, Bellefonte Division, Warner Co., Bellefonte, Penn., which operated 264,689 manhours without a lost-time accident. Wm. M. Smith received the trophy for the Warner Co.

Honorable mention certificates were given to the other accident free plants, as follows:

Greystone Quarry, Greystone Granite Quarries, Inc., Henderson, N. C., (plant was trophy winner in 1953 contest)

North Branford No. 7 Quarry, New Haven Trap Rock Co., North Branford, Conn.

Kimballton Mine, Standard Lime & Cement Co., Kimballton, Va.

Red Hill Quarry, Superior Stone Co., Charlottesville, Va.

Rock Hill Quarry, General Crushed Stone Co., Quakertown, Penn.

Woodleaf Quarry, Superior Stone Co., Woodleaf, N. C.

Jordanville Quarry, General Crushed Stone Co., Jordanville, N. Y.

Watertown Quarry, General Crushed Stone Co., Watertown, N. Y.

Union Furnace Quarry, Warner Co., Bellefonte Div., Tyrone, Penn.

Cedar Hollow Quarry, Warner Co., Devault, Penn.

Yellow Rock Mine, Kentucky Stone Co., Yellow Rock, Ky.

Cape Girardeau Quarry, Federal Materials Co., Cape Girardeau, Mo.

Prospect Stone Plant No. 6, Eastern Rock Products, Inc., Prospect, N. Y.

Tyrone Mine, Kentucky Stone Co., Lawrenceburg, Ky.

Avoca Quarry, Jefferson County Stone Co., Avoca, Ky.

Plant No. 4 Quarry, Southwest Stone Co., Knippa, Texas

Randville Quarry, Superior Rock Products Co., Sagola, Mich.

No. 7 Quarry, Columbia Quarry Co., Elsberry, Mo.

High Bridge Mine, Kentucky Stone Co., High Bridge, Ky.

Elkton Quarry, Kentucky Stone Co., Elkton, Ky.

(Continued on page 124)

Wm. M. Smith, accepting safety trophy for Bell Mine, Bellefonte Div., Warner Co., Bellefonte, Penn., from **Henry H. Kirwin,** chairman of the accident prevention committee, left

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Highway Legislation

"HIGHWAY LEGISLATION—What Happened and What's Ahead" was the title of a paper presented by Arthur C. Butler, Director, National Highway Users Conference, which summarized the developments in this most important legislation.

A receptive climate for an expanded highway program created by Project

Arthur C. Butler, director, National Highway Users Conference, speaker on highway legislation

Adequate Roads and other activities of the last few years was given some credit for the favorable receipt of the president's July, 1954, message to the Governor's Conference calling for a greatly expanded highway program.

Congressional indecision was blamed for slowing many states and cities in their road-building efforts. A survey by the American Municipal Association revealed that in 85 cities, representing 38 states and the District of Columbia, 129 projects estimated at $5.5 billion are, or will be, adversely affected because no federal program was enacted in 1955.

Another detriment is that road construction costs are rising, 3.2 percent in the last quarter of 1955 over the 1954 average. Further delays, he said, will add to both the expense and the need. He cited increases in the number of motor vehicles.

Mr. Butler told of what happened in the 1955 Congress, as a basis for consideration of this year's legislative picture. All the various bills based on the proposal of the Clay Committee were defeated largely because of their financing features. The Gore Bill which passed the Senate and which bases allocation on the old formula of population, area and mileage rather than needs studies may yet be heard from in this session.

The 1955 Fallon Bill failed because the financing would have seriously penalized commercial highway transportation. Built-in financing features and plain politics contributed to the defeat of any highway legislation.

Interested groups have since consolidated some principles and are working together as a unit with apparently effective results. Twelve important national organizations, through the National Grange have transmitted a statement of their views to all members of Congress.

They believe the federal government should pay at least 90 percent of the cost for improving the Interstate System and advocate completion in 10 to 12 years. Federal funds for other systems would continue to be matched by the states on a 50:50 basis, and the statement was strong on the point that the states' authority and control not be encroached upon.

The Interstate System would require greatest federal outlay because, said Mr. Butler, this 1.2 percent of total mileage carries one sixth of all traffic. These miles serve 65 percent of the urban and 45 percent of our rural population. They touch or cross 406 of the 435 Congressional Districts. Another advantage is that funds may then be released to the States for use on other roads. It would slow down or stop the trend to toll roads which are an expensive and piecemeal attempt to solve a nationwide highway deficiency problem.

Financing recommendations are to come from the House Ways and Means Committee which seems to meet with approval. Thus, the highway bill (HR 8836) recently introduced by Representative Fallon has no financing provisions. Such provisions would be attached later.

The Boggs Bill (HR 9075) providing financing measures is now being heard by the Ways and Means Committee. It provides for increases in fuels (1¢ per gal.) and on levies for tires and new trucks, buses, etc., which most highway users consider fair. It promises to obtain the needed revenue and at the same time places tax burden in reasonable proportion for heavy vehicles over light vehicles and automobiles.

A study indicates that the tax increases in the bill would cost the average automobile owner $7.92 per yr. The figure scales upward to a peak of $253.92 for an average bus. The yield would be an added $12 billion and be in effect from January 1, 1958, through June 30, 1971. Rep. Boggs has estimated that revenues already derived from motor users would yield $22 billion, adding to a total of $34 billion.

The Fallon Bill would earmark $25 billion for the Interstate System over a 13-yr. period. Also, Congress would add $25 million each year through 1969, to the authorization for other federal-aid roads to be matched 50:50. Most highway users favor the Fallon Bill; the excepted provision being the restrictions on maximum vehicle dimensions and weights. This feature is in for strenuous opposition.

Mr. Butler believes there will be cause for optimism if the essentials of the Fallon and Boggs Bills become law.

Insurance Subrogation

WARREN C. ROWE, treasurer, Rowe Contracting Co., Malden, Mass., and chairman, N.C.S.A. subrogation committee, gave a progress report entitled "Significant Development Regarding Insurance Subrogation Problems." In the way of background, Mr. Rowe explained that the association formed the subrogation committee in 1953 in order to investigate the increasing number of homeowner claims against blasting damages under the extended coverage provision. These claims were being paid by the insurance companies, often without consulting with the quarry owner; later the insurance company would take the legal step known as subrogation to recover from the quarry firm the money paid to the policyholder.

Since its beginning, the committee has made important strides on both local and national levels, in bridging the gap of lack of understanding on the part of the insurance companies. One action described occurred a year ago, in which the committee, through the Massachusetts Crushed Stone Association, issued a formal notice to all insurance adjusters and claim agents, advising them of the allowable limits of vibrations now recognized by the state and recommending their careful study of all claims of vibration damage before paying off such claims.

Mr. Rowe described a second incident occurring last June which ultimately led to what is perhaps the most outstanding development in the subrogation field—namely the formation on a national level of a joint working committee composed of members from industry and insurance. The incident involved a new but small quarrying operation near St. Louis. Besieged with a number of subrogation claims shortly

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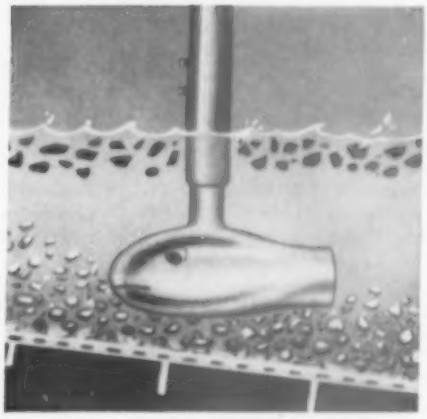

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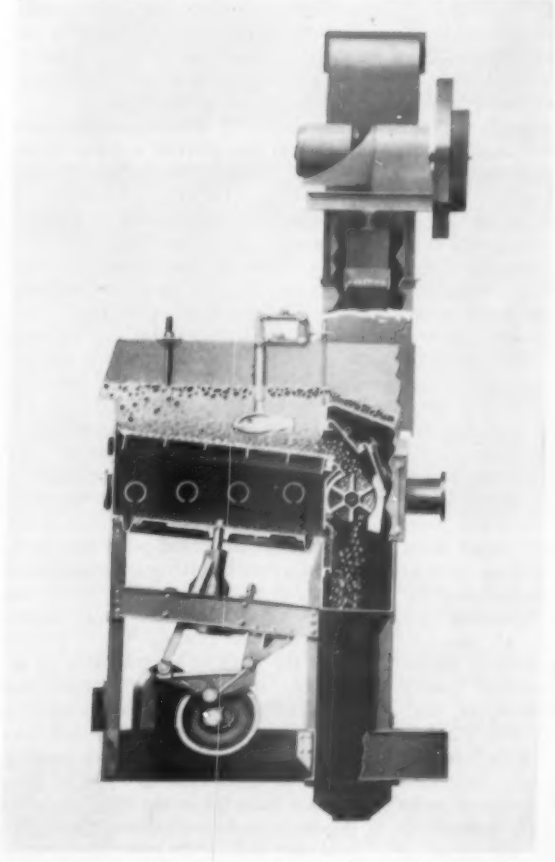

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after starting quarrying (in spite the blasts involving only 300 lb. charges), the quarry operator appealed to the adjustors, but to no avail. He then appealed to the National Board of Fire Underwriters in New York and the N.C.S.A. subrogation committee, with the result that a vibration conference was held June 8-9 in St. Louis. The first day was set aside in the field to observe the blast and to make seismic and air pressure recordings, followed on the second day by a round table discussion. Partaking in the conference were representatives from the local company, the N.B.F.U., an explosives company, as well as physicists, seismologists, engineers, and insurance adjustors. The outgrowth of the conference was the formation of a joint committee consisting of representatives from the N.B.F.U., and explosives manufacturers and users, to set up a set of ground rules for use by both the explosives user and the insurance adjustor charged with handling blasting claims. The significance of the conference, Mr. Rowe pointed out, was that it was the first time a national fire insurance organization (comprising 224 members) gave due recognition to the methods employed and the vibration facts obtained by quarry operators.

The June meeting was followed by a joint committee meeting in New York on August 9, out of which evolved the formation of a smaller working subcommittee. This group was charged with evolving a yardstick and procedure that will acquaint the adjusting fraternity with the true facts of blasting so that a minimum of litigation will result either by way of direct suit or subrogation. Some of the important points brought out in the meeting were enumerated by Mr. Rowe. They were:

1. Industry urged to conduct operations within known safe limits and avail itself of best engineering talent.

2. Set up good standard procedure leading up to a shot so as to minimize complaints.

3. Close cooperation desirable between the insurance, explosives, and blasting industries.

4. An appreciation of the ground covered in respect to vibration by the New Jersey and Massachusetts Regulations.

5. Scientific records of blasting operations are important in that here is factual evidence that can be evaluated.

6. Develop for adjustors a proper course of procedure in respect to blasting claims.

7. Urge that minimum standards be set up under which no damage will be done.

8. Urge that the insurance business avail itself of all the research that has been undertaken recently.

9. Importance attached to need of carefully evaluating the first claim in a given area.

The latest development reported by the speaker was the joint working subcommittee meeting held on September 26 in New York, with Mr. Rowe, a representative from the National Lime Association, and three fire and casualty insurance men present. One outgrowth of the meeting was the decision to add Dr. Don Leet to the committee.

Mr. Rowe pointed out that the subrogation committee, besides having worked successfully with the stock fire and stock casualty companies, also hopes soon to make progress with the mutual insurance firms.

In conclusion, Mr. Rowe outlined several progress conclusions and recommendations as a result of his committee's work. These are:

1. The vibration truth serum has been injected into the insurance veins, but more is needed.

2. Local efforts must be made, through vibration demonstrations. Good public relations are necessary.

3. Cooperation has been established between the insurance industry and users of dynamite.

4. Use best engineering advice in setting up shots.

5. Important to take seismic records occasionally, keep on file, and correlate with overall operations.

6. Pre-inspection should take place where possible.

He added that the vibration profession and several associations, including N.L.A., N.S.G.A., N.A.I.I., American Mining Congress, and the Explosives Institute, have shown a keen desire to keep abreast of the work of the joint committee in New York. He also believed that a set of standard procedures for approaching blasting claims will be adopted soon for both powder users and claims adjustors in New York state.

Percentage Depletion

IN A TALK, "Recent Developments in the Field of Percentage Depletion," John F. Lane, Gall, Lane and Howe, Washington, D. C., general counsel, N.C.S.A., pointed out that many difficult problems on percentage depletion have evolved out of the complicated 1951 and 1954 revenue acts, for which there are no clearcut answers at the present. Two of the more important issues he discussed were (1) the manner of classifying stone to determine the percentage depletion rate and (2) the cutoff issue, i.e., at what stage of the process percentage depletion ceases to be allowed. The cutoff issue prevails in both acts, he said, whereas the question of rates is involved only in the 1951 act, the matter having been resolved in the 1954 code with the formal adoption of the end use test.

The speaker indicated that the Treasury Department is insisting on using the end use test in the 1951 act, even though the act specifically grants stone 5 percent; dolomite, calcium carbonates, and magnesium carbonates, 10 percent; and chemical limestone and metallurgical limestone, 15 percent. Under this decision, geological terminology and accepted common quarry terms are being overlooked, he said. The speaker discussed the Virginia Limestone Corp. case which was submitted to the courts in July, 1955 and has yet to be decided. Issues at stake in this case are "what is dolomite?" and "does the end use test apply to dolomite?" Mr. Lane mentioned that there are at least five other cases pending in the U. S., which contest the end use ruling. He said that these cases may take months before decisions are reached; consequently the industry faces a period of continued uncertainty as to end use provision.

Regarding the cutoff issue, Mr. Lane stated that the greatest volume of income tax dollars rides on the resolving of this issue. To date, he said, there has been nothing definite formalized in the regulations, resulting in a great lack of uniformity throughout the country in treating the problem. In some areas, like the East, the cutoff issue has been raised but little; in most cases sales of fine grained products are not excluded. In other areas, like the West and Midwest, the problem is acute. The cutoff point most frequently used appears to be the roadstone size, he observed. Mr. Lane cited several decisions in 1955 concerning related industries; e.g., in the Cherokee Brick & Tile case, the cutoff point was burning; in a case involving a granite building stone firm, the cutoff point was that point at which the rough blocks were ready for sawing.

On the basis of several lines of argument, the speaker recommended that producers cut off nothing in filing their return. They should include sales of fine products and even bagging costs, he contended. If bagging costs are not included in the tax return, the producer could not recover these costs at a later date in the event the treasury

(Continued on page 128)

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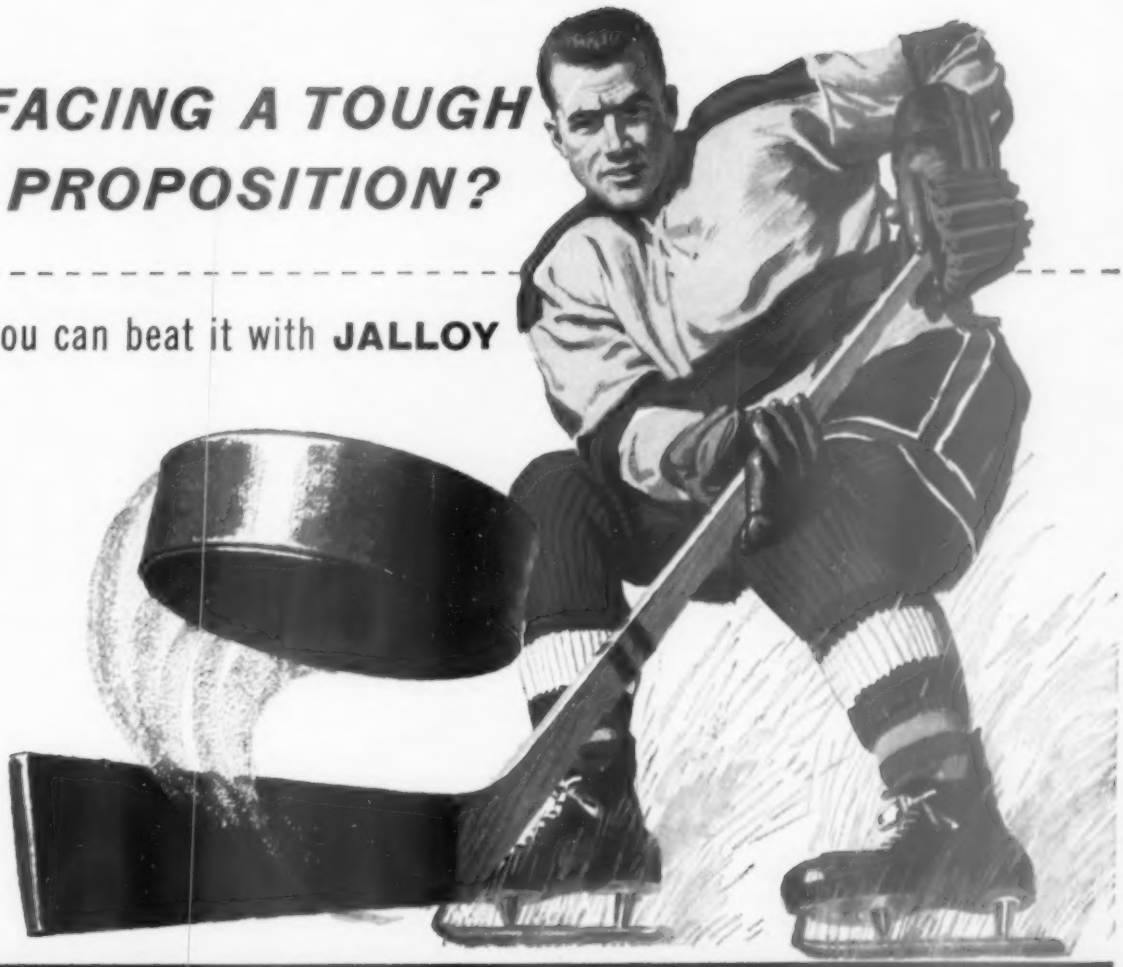

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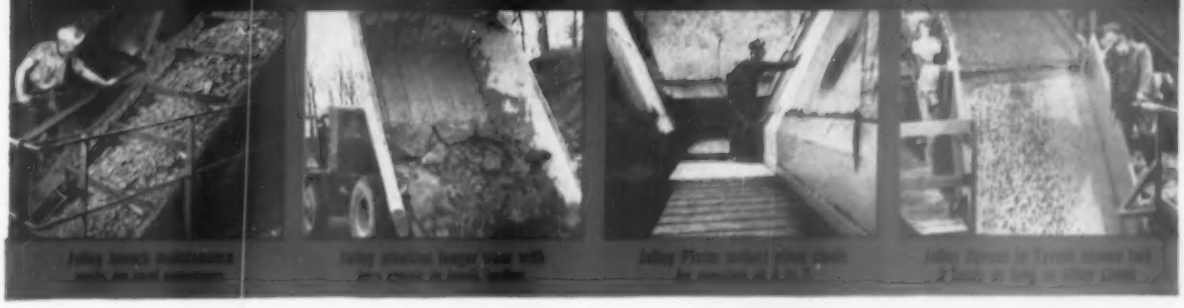

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department would issue a definite ruling allowing these costs.

In conclusion, Mr. Lane urged producers to keep a close look on percentage depletion developments via N.C.S.A. bulletins, to work closely with their tax counsel, and to keep alert and protect their position.

Technical Developments

G. Donald Kennedy, president, Portland Cement Association, Chicago, in a talk on "New Developments in Concrete," stated that we are on the threshold of greater use of portland cement and concrete in construction, which of course, will be reflected in increased crushed stone demand. To support this view, he discussed recent developments in structural concrete (including prestressing, precast structural members, concrete products, ready-mixed concrete, and thin-shell roofs), highway paving, concrete on the farm, and concrete for public works, such as water and sewerage facilities.

One outstanding development referred to was prestressed concrete, which has grown to major importance in the U. S. in a matter of a few years. Mr. Kennedy pointed to economies in the use of both steel and concrete in prestressing which makes possible longer spans and heavier loads in bridges, floors, etc.; in addition, smaller or shallower members can be built where headroom or floor space are at a premium. Prestressed girders of more than 100-ft. spans have already been used for gymnasium construction, he said. Reference was made to the 24-mile long Lake Pontchartrain Bridge near New Orleans—the world's largest highway bridge—which is being built with prestressed concrete bridge deck slabs and concrete piles, the latter weighing 220 tons each. Mr. Kennedy also reported that experiments are underway in the use of prestressed concrete for such new fields as highway and airport pavement slabs.

In the precast structural member field, the speaker pointed to the prominence already achieved by the tilt-up and lift slab techniques and by precast joist and floor systems. As for the future, Mr. Kennedy predicted that entire buildings, including frames, walls, floors, and roofs, will be precast—and thereby compete favorably with cast-in-place reinforced concrete or steel or timber, especially for one-story factory and commercial buildings. But, he added, cast-in-place concrete will continue to serve as the indispensable job-made structural material for many uses, due to its flexibility and economy.

Mr. Kennedy also pointed to the growing stature of the concrete masonry and ready-mixed concrete industries, each of which are experiencing record sales. New masonry units such as split rock, slump block, shadow wall block, and glazed block—with color—are sweeping the housing markets. High pressure steam curing is also playing a major role. He pointed out that the ready-mix industry, based on its ability to reach and fill almost every farm and urban need because of its widespread operation, guarantees a larger share of the future construction market for concrete.

The speaker listed thin-shell concrete roofs (3½- or 4-in. slabs) as a major new development; they are curved in various attractive shapes, carry relatively large loads, and can vault large floor areas with supporting columns. As outstanding examples, he cited two hanger installations at Chicago's Midway Airport, spanning 270 and 257 ft., respectively; the St. Louis airport passenger terminal, spanning 116 ft.; and the new attractive M.I.T. auditorium. Modern expression in concrete construction is also coming to the forefront in this country, he said. In the highway field, the need for complex interchanges and grade separation structures has provided a new market for prestressed and precast concrete.

Mr. Kennedy also discussed recent technological developments which have led to better concrete highways. Among these were the use of air entrainment, granular sub-bases under heavy-duty concrete pavement slabs (to prevent pumping), sawed joints, and the traveling form paver. Use of air-entrainment has eliminated pavement scaling caused by ice-melting salts and has resisted the effects of repeated cycles of freezing and thawing; its use has grown steadily, he said, until now 32 state highway departments specify air-entrainment for all concrete pavements, and 11 others specify it under some conditions. Sawed joints, which permit uninterrupted construction of pavement, and eliminate the "thumping" sound of tires, are being used on heavy-duty roads throughout the nation and are specified by 14 or more states. The traveling form paver lowers the initial cost of paving, making it more competitive in road construction. He reported that 60 miles of pavement are scheduled for construction with this type of paver in 1956 in Iowa. Mr. Kennedy added that crushed stone has a great future in the highway field—as a granular sub-base and as a concrete aggregate.

In other areas of concrete usage, Mr. Kennedy pointed to the increasing number of paved feeding lots on farms and the increased amount of concrete and concrete masonry being used in farm construction.

Bituminous Concrete Mixes

Donald D. Dagler, District Engineer, Asphalt Institute, Harrisburg, Penn., gave an illustrated talk on "Plant Control of Bituminous Concrete Mixes." Mr. Dagler considered good plant control, good design, adequate subbase and good controlled method of placing the material as four requirements for quality asphaltic concrete paving. He thought that bituminous concrete would be more widely used if more engineers knew how to use it.

The speaker confined his remarks primarily to hot mix plants, which, he said, account for 80 percent of the bituminous concrete output. The talk centered around a group of colored slides taken at a modern, efficient plant in Pennsylvania, which illustrated good practice in all phases of operation. Basic elements of good plant control pointed out included proper grading of aggregates ahead of the cold elevator, proper drying and temperature control, efficient screening, and proper mixing.

The following do's and dont's were emphasized by the speaker.

1. Have separate hot and cold mix facilities. Using the same pug mill for both mixes will reduce quality.

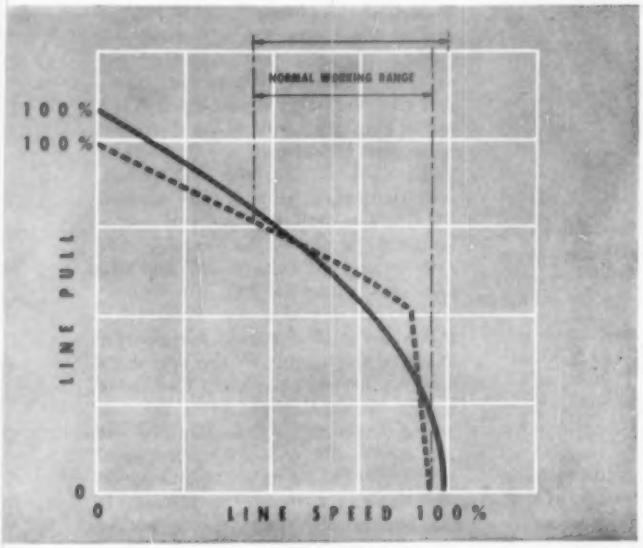
2. Regarding asphalt storage, have two or more tanks for flexibility. Have a recirculating piping system (with return lines), so that a uniform temperature can be maintained. To insure against contamination, check all asphalt deliveries with a petrometer.

3. Regarding aggregates, use cubical materials. Avoid segregation in stockpiles, by using low piles. Never stockpile over a bank. Crane operator should work entire pile, excavating in layers. Use at least three material bins, to accommodate several sizes. This will permit blending, if necessary, to obtain a properly graded plant feed. Use automatic vibrating feeders and vibrators on bins for controlling feed to cold elevator (in some states this is required).

4. The dryer speed and temperature (latter determined by pyrometer) should be regulated according to the wetness and temperature of the feed. Never overload. Too much moisture in the mix might cause stripping on

(Continued on page 132)

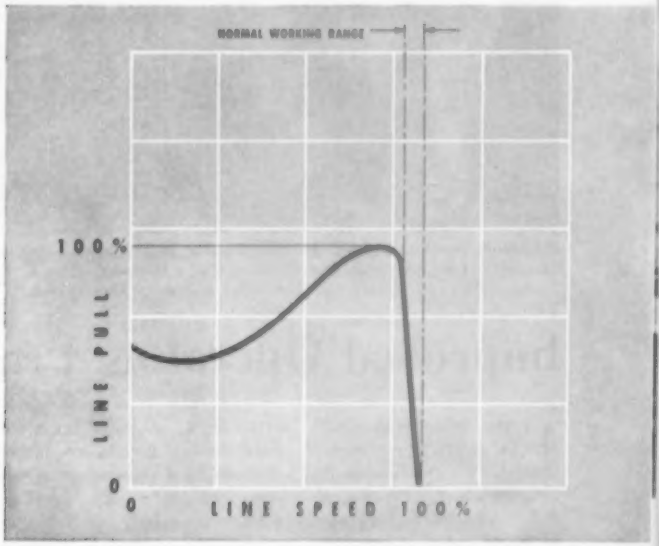
LIMA teams A.C. electric motor with torque converter for power-on-demand through wide operating range



Power Performance of LIMA'S New Optional Unit:

A.C. Electric motor with torque converter drive. (Diesel-torque converter curve (dotted line) shown for comparison.)

With this drive, even under extreme loading, the motor will pull down in speed only a very small amount. It can never be stalled. The line pull will constantly increase through a long pull down speed range, depending upon the load applied.



Power Performance of A.C. Electric Motor with Direct Drive:

The motor speed and torque vary as shown for line speed and pull.

With a pull down in speed of only 3% to 5%, torque rises too fast. The motor will stall quickly after peak torque is reached. Workable speed range is small, stalls are frequent.

Lower First Cost — Reduced Maintenance

Now another quality-extra is available on all Lima machines. It's Lima's new electric power unit designed to give you full power-on-demand through a wide operating range.

Combining a single A.C. motor with a single stage torque converter, this drive matches, *electrically*, diesel-torque converter performance. It powers all motions and permits application of full power to any one motion as required. Under extreme loading, required power output is supplied at constant motor speed . . . and the motor can't stall or burn out.

The simplified electrical setup—with single A.C. motor and no complicated electrical controls—means lower first cost. Electrical maintenance is reduced to a minimum, and servicing does not require highly trained personnel.

Just check the performance curves above. You'll quickly see that Lima's quality-built electric power unit provides the ideal answer for *your* jobs calling for electrically powered machines. You'll get maximum power performance under all operating conditions. Get full details now from your nearby Lima distributor . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

CAPACITIES

Shovels ½ yd. to 6 yds. Cranes to 110 tons. Draglines variable. Smaller capacities available on rubber

Baldwin-Lima-Hamilton Corporation Construction Equipment Division also manufactures Austin-Western Crushing, Washing and Screening Plants at its Lima, Ohio plant . . . and Madsen Asphalt Mixing Plants and equipment at its La Mirada, California, plant.

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DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

Operating panel members. left to right: Richard Robinson, Massachusetts Broken Stone Co.; G. D. Lott, Jr., Palmetto Quarries Co., chairman; John R. Kringel, New York Trap Rock Corp.; and Alan K. Raney, General Electric Co.

Improved Operating Practices

AT THE SESSION presided over by G. D. Lott, Jr., president, Palmetto Quarries Co., Columbia, S. C., a sound-color picture "People, Products and Progress, 1975," forecasting what life in the United States can be like in 1975, was shown. The film was sponsored by the Chamber of Commerce of the United States. The story it told is based on information gathered from industrial and trade associations, and industrial organizations. Atomic powered cars, television aids to driving, and spectacular highways are only a part of the scene they predict 20 years from now. Aggregates for construction will still be an important part of the economy, judging from scenes in the story of progress.

"Rock Breakage by Explosives," a slow-motion picture that aptly demonstrated quarry blasting, was shown. Wilbur I. Duvall, physicist, Applied Physics Laboratory, Division of Mineral Technology, U. S. Bureau of Mines, College Park, Md., gave a running commentary on the demonstration. The pictures were taken with special equipment that took 1000, 2000 and up to 3000 pictures per second.

Mr. Duvall reviewed the old theory of how rock breaks from explosive blasts saying it was formerly held that gases push the rock out as they expand in the hole and continue to expand in the cracks and one might expect to see the gases emerge from the rock cracks. However, studies of the films shown do not in any sense bear out this old theory. Mr. Duvall used the blackboard to illustrate that the gas-pressure pulse is like the impact of a hammer and this sets up an impulse that travels out from the hole at speeds equivalent to the speed of sound in rock. It might be called a high compression strain impulse that travels out from the charge and loses velocity progressively. If the hole is left open, or the charge confined with light stemming, all the gases escape through the hole. During the discussion, it developed that delay blasting had not been studied as yet by the use of the high speed camera; primacord was used on some of the quarry shots (Lithonia, Ga.). The speaker felt that better fragmentation from fly-velocity (not high-velocity) might be partly due to more energy being available.

"Latest Developments in Primary Drilling and Their Effect on Quarry Efficiency" was the subject of papers by three quarry operators. These papers were titled: "Six-inch Diameter Down-the-Hole Drill," by M. Hankin, Jr., executive vice-president, North Jersey Quarry Co., Summit, N. J.; "Four-inch Diameter Percussion Drill" by Harry H. Haas, general manager, Buffalo Crushed Stone Corp., Buffalo, N. Y., and "Nine-inch Diameter Churn Drill" by W. Irwin Gill, Gill Rock Drill Co., Lebanon, Penn.

W. I. Duvall, physicist, Div. of Mineral Technology, Bureau of Mines, a speaker on operating panel

The "Down-the-Hole" drill is a development of the Ingersoll-Rand Co. and its use introduces a new terminology in quarry literature. This "Drill-Master" drill is lowered in the hole as drilling progresses, and at all times the cutting edge is almost a part of the drill. It is claimed that by the use of this drill no energy is lost through the use of long drill stems as the drill stem is between the surface and the drilling mechanism. As the hole is deepened, drill stems can be added as needed. Mr. Hankin showed pictures of operation and the quarry. He discussed the over-all operation of the drill and said the "down-the-hole drill" cut drilling costs about one-third. Mr. Hankin felt that a high caliber man should operate the unit and compared the operator's qualifications as paralleling those of a shovel operator. Eight cents per ton was given as the total drilling cost. At this quarry, the unit drills deep holes with a 4-ft. strata of softer and partly disintegrated rock at the surface. It was explained in the discussion period that this stone was scalped out following primary crusher operations and used for shoulder material. It is in the minus 2½-in. range and carries with it any of the softer and dirty rock.

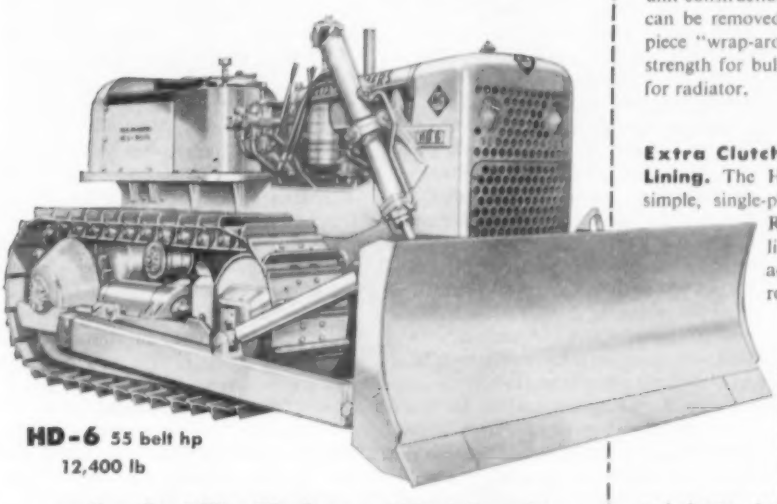
Mr. Haas briefly described his quarry as being a flat limestone formation that weighed 4500 lb. per cu. yd. in the deposit. The primary crusher has a capacity of 700 t.p.h., and 25-ton Mack trucks do the quarry haulage. He said he formerly used wagon drills drilling 2-in. holes and had a crew of seven men. A 3½-in. Joy "Above-the-Hole" drill with a two-man crew is now used. Holes are put down on a 12- x 14-ft. pattern with a shallow face (20-ft.) at the rate of 20 to 25 f.p.h., and blasting breaks 13.84 tons per foot of hole. On some 47,000 ft. of hole the following costs were given.

	Cents
Labor	17.1
Bits	8.0
Steel	12.4
Depreciation	1.2
Fuel	.3
Total	39.0 per ft. of hole

This amounts to 2.8 cents per ton of rock broken. A drop ball is used for secondary breakage.

The third panel member, Mr. Gill, described features of drilling at three of the quarries of the New Haven Trap Rock Co. These operations produce 1,500,000 tons yearly of hard, tough trap rock, and 9-in. drill holes were sunk. The stone has a Los Angeles rattler rating of about 16. The hole is 9⅜-in. in diameter with 9¼-in. gauge maintained to the bottom of the hole. The speaker said 22,000 lin. ft. of hole is drilled per year with a

This kind of Crawler Tractor Design gives you extra output



HD-6 55 belt hp
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. . . and only Allis-Chalmers HD-6 has it—

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Look at the Allis-Chalmers HD-6—you can see its functional design . . . how it's built to give sure-footed traction, better working balance. But there's more to this crawler tractor than meets the eye—the performance advantages of Allis-Chalmers advanced basic design. It provides more working power, more strength in all components, more working weight where it's needed . . . makes the HD-6 an outstanding performer with drawn or mounted equipment . . . easier to operate and maintain.

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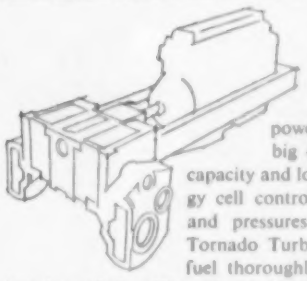
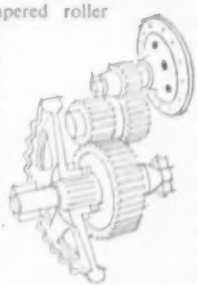


Allis-Chalmers Heavy-Duty Diesel Engine. The HD-6 power plant is designed for big output, ample reserve capacity and low maintenance. Energy cell controls combustion timing and pressures for high efficiency. Tornado Turbulence mixes air and fuel thoroughly for more complete burning. Follow-Through combustion sustains effective working pressures to take advantage of better crankshaft leverage.

Special Strength and Protection. Exclusive all-steel box-A main frame makes possible superior over-all balance, better equipment mounting . . . plus service simplicity of unit construction. Major assemblies like engine and clutch can be removed without disturbing adjacent parts. One-piece "wrap-around" radiator guard provides maximum strength for bulldozer mounting . . . complete protection for radiator.

Extra Clutch Life—with Ceramic Lining. The HD-6 master clutch offers simple, single-plate, over-center design. Revolutionary new ceramic button clutch lining keeps clutch operating longer between adjustments . . . lengthens clutch life . . . reduces lever pull for easier operation.

Straddle-Mounted Final Drive Gears. Tapered roller bearings support both ends of the final drive gear shafts. Smaller gears and shorter shafts (plus line-bored, one-piece case), provide better bearing and gear alignment, more strength, longer life. Double-reduction final drives provide greater ground clearance.



New-Design, Heavy-Duty Track. HD-6 track provides long life under the toughest conditions. HD-6 sidebars have more steel where it's needed . . . benefit from new heat-treating methods which make possible new standards of strength and hardness throughout for extra wearability.

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. . . no other tractor in this size class has them—at no extra cost you get roller bearing truck wheels, idlers and support rollers; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting; crankcase guard; bumper; and lights.

ALLIS-CHALMERS

Operating panel members: Left to right: Harry H. Haas, Buffalo Crushed Stone Corp.; M. Hankin, Jr., North Jersey Quarry Co.; and W. Irwin Gill, Gill Rock Drill Co.

yield of 70 tons per lin. ft. Average drilling rate is 3 ft. per hour with crawler-mounted drills with a two-man crew per drill. The drilling is on a contract basis. Drill bits are sharpened at 14 ft. with the work done at the Lebanon plant of the Gill Rock Drill Co. The hole pattern varied at the three quarries; 28 x 26 ft., 20 x 40 ft., and 23 x 35 ft. were the general spacings with high faces. Holes were put down 5 ft. below the quarry floor and seven to 30 holes were fired per shot. He gave 9½ to 10 cents per ton as the total cost. Films were shown of the quarries involved.

"Methods and Operation of Surge Pile Storage" was the subject of a paper by Richard Robinson, general manager, Massachusetts Broken Stone Co., Weston, Mass. The speaker said that at first he was skeptical as to the possibilities of using surge piles where snow and ice conditions often prevail as in his area but after observing a surge pile at an asbestos mine in Vermont where temperature got as low as 20 deg. below zero, a program of reconstruction was started at the plant and now there are three surge piles. Following the primary crusher, the stone is sized and sent to its respective surge pile. These sizes are: minus 5-in., plus 3-in.; minus 3-in., plus ⅜-in.; and minus ⅜-in. to zero. Following the surge pile, there is a five-stage crusher set-up. Vibrating feeders are used to feed the reclaiming belt conveyor that operates in a tunnel below the two coarser sizes. The minus ⅜-in. material is recovered by front-end loaders. Although 36-in. wide belts are used, Mr. Robinson advocated 42 to 48-in. widths for the larger stone. The surge piles have a live load capacity of 4000 tons, he said. During the winter there is no freezing of the 5-in. stone pile, and by keeping the medium sized stone (3-in. to ⅜-in.) pile alive (by using it), no trouble was experienced, but a thin crust has formed on this pile when it is not used. The stone has a Los Angeles rating of 12 and the fines are used for road stone with a good market outlet.

During the discussion, it developed that if one wanted some dry fines during wet periods some of the 5-in. wet stone would be processed in the five-stage crushing set-up which gave a dry material. This quarry is now on its third level so no clay or mud is present, the speaker said. In summarizing the paper, surge piles, by removing and storing the fines separately, proved to be a successful operation in spite of snow, slush and snow-ice-matrix possibilities. Apparently no heat was used anywhere although this was not brought out in the discussion.

John R. Kringel, assistant to vice-president in charge of operations, New York Trap Rock Corp., Newburgh, N. Y., discussed in general terms the problem of spillage in highway hauling. He brought out that while there are limitations on the positive control of overloading and spillage, not solving the problem adversely affects good public relations. Competitive aspects, with emphasis on contract hauling, was also included in his discussion.

Centralized Controls

Alan K. Raney, application engineer, Rock Products Industries, General Electric Co., Schenectady, N. Y., spoke on the subject, "Centralized Controls Can Save Labor, Production Delays, and Maintenance in Crushed Stone Plants." By means of slides, Mr. Raney discussed the bench-type and the panel type of control panels. Some of the slides were taken at industries where handling problems parallel the crushed stone operations (coal). One depicted a 6000 t.p.h. operating panel and a smaller (750 t.p.h.) material operating panel was also shown. During the discussion, it was asked if a 250 t.p.h. operation could expect reduced costs by installing the centralized control system, and it developed that a more efficient operation might result. A man might not be needed in the control room at all times, or the control man also could be the electrician. Centralized controls need more wiring but the electrical equipment is in one spot so that troubles can be quickly located and corrected. With reference to the use of TV on an operating panel, the speaker said that it was available but costly and he estimated the cost to be from $2000 to $4000 per installation and further pointed out that an electronic engineer might be needed to keep the unit (or units) working. The speaker briefly discussed "vicinity" panel controls vs. more remote controls, explaining that the former could include primary crusher and related operations where the control man could see all the operation. With more remote control set-ups, ample safeguards around all moving parts should be a "must."

BITUMINOUS MIXES

(Continued from page 128)

the job. The flames should not touch the material. The temperature of the aggregate should be within 15 deg. of the asphalt temperature.

5. For dust-control, the dryer and hot and cold elevators should be vented to a dust collector. This will keep the machinery clean and reduce maintenance costs, and the collected dust can be returned to the system if it is not too excessive.

6. The screens should never be overloaded. The screening efficiency should be uniformly controlled, and not run 10 percent one day, 50 percent the next. In Pennsylvania ± 15 percent screening efficiency is required. The mix design should be based upon the screening efficiency, among other things.

7. The multi-compartment bins should be fitted with sampling ports and thermometers. If the binned material gets too cold, the bin should be drawn and the material recirculated to the dryer.

8. Follow the mix design specifications closely, since use of improper materials and weights will result in a poor job, which will reflect poorly on bituminous concrete.

9. Regarding mixing, the pug mill paddles should be kept in good condition. Broken paddles should be replaced, particularly if two adjacent paddles are broken. The pug mill should be equipped with a timer.

10. Maintain a well-equipped testing laboratory. Major equipment should include fine and coarse aggregate sieves, scale, and asphalt extractors. The speaker also described the Marshall apparatus for preparing and breaking specimens.

(Reports continued on page 172)

AMSCO PUMP APPLICATION FILE

at: AMERICAN AGGREGATES CORP.
BRIGHTON, MICHIGAN

"Started with one AMSCO® pump in 1926 ... now we have 17 in operation"

Twenty-nine years ago, the Brighton operation of American Aggregates Corporation began hydraulic dredging operations with one 15″ Amsco pump. Today, they have 17 pumps in operation, including 6, 10, 12, 16 and 20″ units.

Because the Brighton operation pumps a 60% sand, 40% gravel mixture —just the reverse of American Aggregates market demand—there is substantial pump-back of sand into the excavations. This heavy demand on the pumping equipment is partially responsible for American Aggregates' trend to larger pumping units. According to Mel Kerr, American Aggregates Vice President, "That new Amsco 20″ pump certainly does a job. We produce more on two shifts with this unit than we did with five shifts using a 16″ pump."

Last year, American Aggregates relied on Amsco pumping equipment to make them the world's largest producer of commercial processed sand and gravel.

QUICK FACTS ABOUT AMSCO PUMPS. Whether your dredging operation is large or small, you can get an Amsco Dredge Pump to handle the job. Standard sizes range from 6″ to 20″ discharge openings. Larger sizes are also available. An Amsco pump engineer will be glad to discuss your requirements, or write for Bulletin 1052P, giving full information and specifications on the Amsco line.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DELAWARE, OAKLAND, ST. LOUIS, JOLIETTE, QUEBEC

A Stepped-Up Highway Program

(Continued from page 106)

tionship the delicate balance of equity the states have been trying to establish between the different classes of vehicles during the past 45 years. Mr. Knowlton indicated that the present session of Congress will face some additional handicaps inherent during an election year, but that it will be freed of a large number of controversial features which experience of the last session proved to be unacceptable.

The body of the report consisted of 12 charts showing several basic aspects of the problem. These included maps of the national system of interstate highways and toll roads and several graphs — one relating highway construction costs to all purpose construction costs since 1915; one showing authorizations of federal aid for highways since 1917; another showing present public highway mileage in the U. S.; another giving proposed federal highway programs and authorizations considered by Congress in 1955 (including the 14-year, $26 billion program suggested by the joint associations and presented at public hearings before the Fallon Committee); and several showing various sources of funds for highway use. Among the latter were three graphs comparing the proposed 20-year federal aid highway budget with (1) estimated revenue from existing federal highway user taxes, (2) with rates on motor fuel taxes increased 50 percent, and (3) with rates on motor fuels, motor parts and accessories, tires and tubes increased 50 percent.

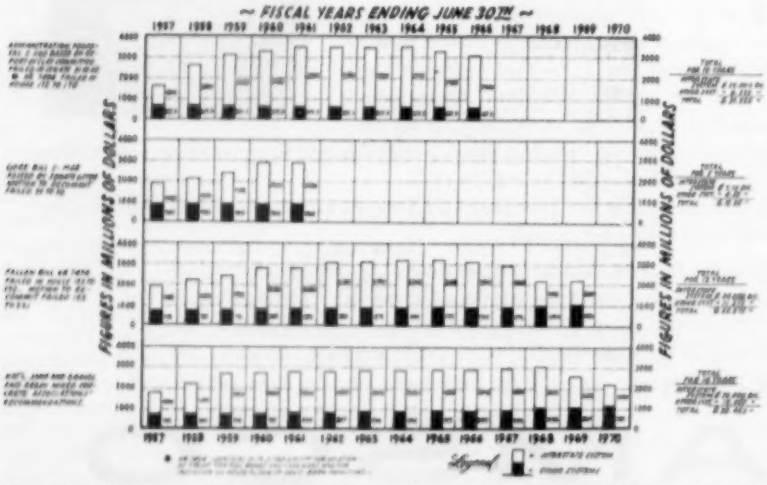
Mr. Knowlton pointed out that the latter proposal is a compromise plan based on the concept that all revenue from Federal highway "use" taxes should be devoted to highway construction. Within this meaning "use" taxes are those based on commodities, such as fuel, the consumption of which is a measure of the actual use of the highways. One graph showed that in 1976, the estimated revenue from these commodity taxes, if increased 50 percent, would reach $4 billion. The speaker suggested that with an unprecedented dynamic expansion period ahead, the future Federal aid highway needs may reach and even exceed this very high level of estimated revenue. He offered this reasoning as a sound argument for the pay-as-you-go basis of financing.

In discussing the problems ahead, Mr. Knowlton pointed to certain optimistic signs which have developed since Congress adjourned last summer. The most important concerns the pronouncement of the Administration to abandon its formerly held policy of financing the program through highway bond issues outside the federal treasury, in favor of the pay-as-you-go method. In addition, there is evidence of real sincere efforts being made by those national associations and groups which Congress historically has relied upon for help and guidance in highway matters, to resolve their differences so far as is possible in order to avoid many of the serious conflicts which plagued the last session. He indicated that a unanimity of opinion is being manifested on nearly all sides.

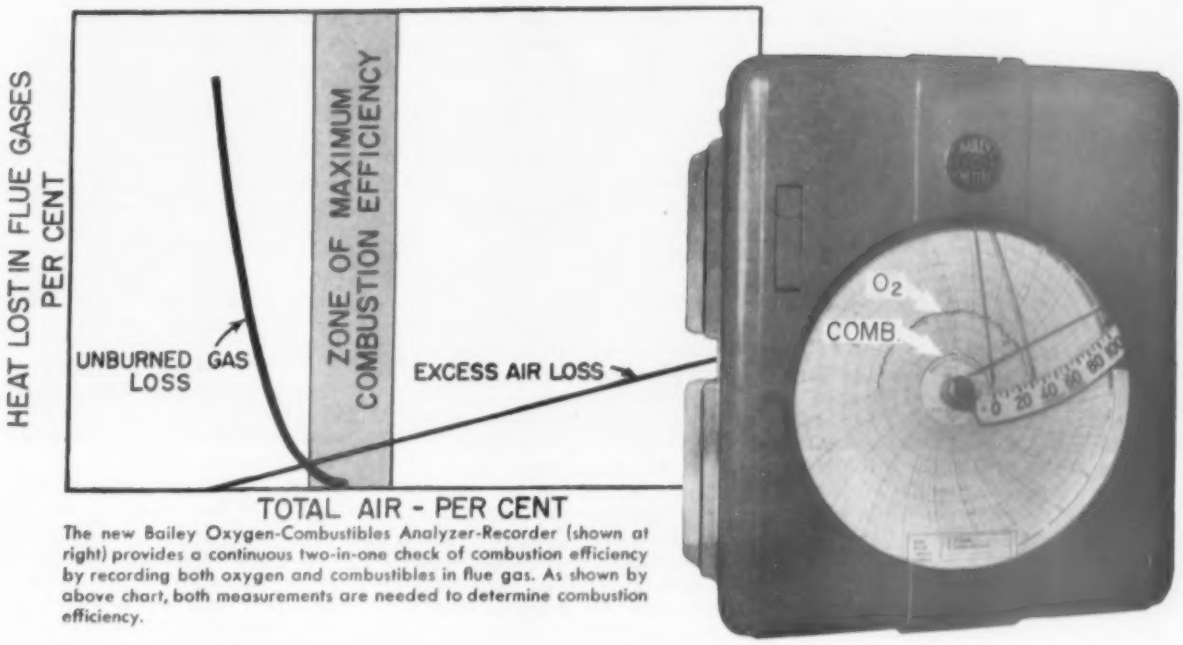
Another favorable development pointed out is the new Fallon Bill HR-8836 introduced in the House January 26th. This new bill now follows the 40-year-old policy of not including in highway authorization bills the necessary financing provisions. It is understood that the House Ways and Means Committee will deal with this important part of the problem. It proposes that Federal aid funds for the Primary and Secondary Systems be apportioned among the states and be matched by the states in the usual manner. Interstate system funds would be apportioned among the states on the basis of estimated cost to complete that system, and be matched on a 90-10 basis, with further matching credit to the public land states. Federal aid funds for public domain roads would also be administered in the same manner as at present.

Another favorable feature is a carefully prescribed provision providing financial credit to the states which have completed either toll roads or free roads which form part of the Interstate System and which have been completed to satisfactory standard. The speaker added that there is much to commend approval of this new bill, and it now has much more chance of adoption since both political parties seem to be committed in its favor. On the other hand, Mr. Knowlton said, the new Fallon Bill while not including the Davis-Bacon labor provision, does include the two other objectionable features; namely, the freeze on dimensions and weights of motor vehicles and a somewhat different form of proposal for extending credit to public utilities for cost of forced moves on account of highway improvement. He indicated that the same powerful pressures exercised upon the last session for adoption of all of these will certainly now be present with undiminished strength. All these new areas of agreement furnish much ground for encouragement that satisfactory highway legislation will be adopted this session. However, he said, there is no room for over-confidence, and failure could be repeated if public interest and support are not accorded Congress in much greater volume and strength than were evident during the last session.

In conclusion Mr. Knowlton lauded Vince Ahearn and the association board of directors for their efforts in behalf of the stepped up highway program. He referred to the last mid-year directors meeting in which approval was given for a formal statement on highway policy and also for the speaker and Mr. Ahearn to work with other associations and groups in the effort to resolve conflicting views about the program. Mr. Knowlton read in full the statement on policy, which was signed not only by N.S.G.A., but also by 10 other leading trade associations, including American Trucking Association, Inc., Rubber Manufacturers As-



One of the charts used by Ezra C. Knowlton to show proposed federal highways authorizations, dimensions of programs, involving only federal and excluding authorizations for forest and public domain roads



The new Bailey Oxygen-Combustibles Analyzer-Recorder (shown at right) provides a continuous two-in-one check of combustion efficiency by recording both oxygen and combustibles in flue gas. As shown by above chart, both measurements are needed to determine combustion efficiency.

BAILEY announces · · ·
New 2 in 1 way to measure Combustion Efficiency

The new Bailey Oxygen-Combustibles Analyzer-Recorder gives you a continuing double check on combustion economy. It's fast response measures and records:

1. Excess air—regardless of the fuel or combinations of fuels being burned.

2. The mixing efficiency of your fuel-burning equipment—by indicating the amount of combustibles in your flue gas, resulting from incomplete mixing of fuel and air.

Combustion efficiency depends upon fuel-air ratio. Too much fuel can be even more costly than too much air. And because of the interdependence of these two factors, no control that measures only one of them can give you complete protection.

Now, for the first time, you can check *both* with a *single* fast acting instrument, using the new Bailey Oxygen-Combustibles Analyzer-Recorder for industrial furnaces, kilns, heaters and boilers.

Fuel economy improves as excess air is reduced —until unburned fuel begins to show up in the flue gas. When this happens, combustion efficiency drops off sharply if there are further decreases in the air-fuel ratio. That's why combustion gases must be analyzed for *both* oxygen and combustibles to get a true indication of efficiency—and that is why Bailey coordinates both measurements on the same chart, to show when excess air may be reduced safely without danger of greater losses from unburned gases.

The Bailey Oxygen-Combustibles Analyzer is an approved combustion safeguard.

Ask your local Bailey engineer for suggestions on application. Equipment details in Product Specifications E65-1 and E12-5. P31-1

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INSTRUMENTS AND CONTROLS

For Power And Process

sociation, and National Association of Motor Bus Operators. The joint statement pointed out the vital need not only for the interstate system but also for other Federal-aid systems, including primary and secondary roads, etc. It called for the Federal government bearing 90 percent of the costs of completing the interstate system (which should be completed within 15 years), and continuation of matching the states on a 50-50 basis for the other systems. It further recommended that the financing arrangements be handled by appropriate committees and that any financing proposals should be equitably applied so no one segment of highway transportation has an undue burden.

Tax Outlook

JOHN T. SAPIENZA, tax counsel for associations, in a paper on "The Tax Outlook for 1956," expressed the belief that there would be continued high taxation for corporations and individuals this year. He thought the 52 percent tax rate on corporations would be extended to 1957 (since it is a bipartisan measure). However, he admitted the possibility of some individual income tax reduction in view of this being a political year.

Regarding percentage depletion, Mr. Sapienza felt there would be no new legislative developments involving percentage depletion in 1956, with a possible exception being a reduction in the 27½ percent rate for oil and gas. Many legislators, he said, have even expressed a desire of having a uniform rate for all minerals, of say 7½ or 10 percent. Mr. Sapienza also pointed to the continual attack being made on percentage depletion by outside interests. He referred to a recent conference held at a midwestern university, wherein several professors lambasted the principle of percentage depletion (particularly for oil and gas), claiming the privilege has become a dole and that it doesn't serve the public welfare. It was claimed that more than $1 billion is lost to the Treasury annually by the excess of percentage depletion over cost depletion. Because of these continuing attacks, Mr. Sapienza stressed the importance of the industry protecting its position on percentage depletion.

The speaker also discussed several Treasury Department rulings issued in the past year or two, which relate to the aggregation of mineral interests, to cash discounts, and to dredging of sand and gravel in navigable streams. Under the first ruling the producer, starting in his 1954 return, may elect to aggregate separate mineral interests, whether located in the same tract of land or in noncontiguous tracts, providing these interests constitute part or all of one operating unit. Once the election to aggregate is made, that practice must be continued unless special permission can be obtained from the treasury department to change. Mr. Sapienza stated that there has been much confusion in applying this new provision because the ruling is not clear as to what constitutes an "operating unit."

Revenue Ruling 55-251 states that a producer who dredges sand and gravel from the bed of a navigable river under a federal permit is not entitled to percentage depletion as a result of the permit alone, since the permit does not give to the taxpayer any legal right nor economic interest in the deposit. The ruling also states that depletion is not allowable on spoil banks built up during previous dredging operations. Mr. Sapienza thought that litigation will be required to settle this matter.

The speaker also commented on the recently-appointed commissioner of Internal Revenue. He hoped there would be a reversal of the decentralization policy in handling tax returns adopted by the predecessor. This policy, he said, has led to unequal treatment of the returns throughout the country, particularly of the minerals industries.

Mr. Sapienza also discussed two changes in the new depreciation schedules, one relating to salvage value and the other to the useful life of machinery. Under the new provision, the useful life is to be determined from the operator's rather than the industry's experience. Thus, such factors as climate, work hours, operator's policy on repair and maintenance, etc. will have a bearing. Other developments discussed involving the new code include pension and profit sharing plans, reserves for estimated expenses, and freight allowances.

Washington Report

In his annual review of the Washington scene, Vincent P. Ahearn, executive secretary, confined his remarks principally to whether President Eisenhower would choose to run again. Based on good lines of reasoning, he thought the decision would most likely be negative—but the talk preceded by one day the medical report giving the president a near-clean bill of health. This factor, of course, turned out to be instrumental in the president's ultimate decision to run. In speaking of Mr. Eisenhower in glowing terms, Mr. Ahearn felt that he would never accept the nomination bid with the reservation of being a part-time president.

In discussing Mr. Eisenhower's official family, he termed Mr. Nixon as the hardest working vice-president this country ever had and whose prestige is growing steadily. As possible presidential (or vice-presidential) candidates, he listed Mr. Nixon, Senator Knowland (whom he termed the Senator's Senator), Secretary of the Treasury Humphries, Governor Knight, and Milton Eisenhower. He also pointed out that Governors Langley and Herter bear watching, each having lately scored major political victories.

Group Insurance

"The Associations' Group Insurance Plan is a Good Investment for My Company" was the title of a paper presented before a joint session of N.S.G.A. and N.R.M.C.A. by William Moore, J. P. O'Connell Co., Boston, Mass.

The associations' program provides a group insurance for its members under a plan supervised by a board of trustees comprising members from its own ranks, and is designed to cover white collar workers.

Mr. Moore's company had about 30 employes eligible for this insurance, many of whom had been faithful employes for many years, and the group plan was entered into in recognition that the welfare of the individual employes and their families was a responsibility of management.

He told of a recent specific instance when he was able, through the plan, quickly to bring personally a check for a death claim to the widow of one of his drivers who was left with two children upon his sudden and unexpected death. Similarly, the dependent coverage took care of medical expenses for the child of a worker who had been bitten by a dog. Other specific cases were cited to emphasize the effectiveness of the plan.

Mr. Moore stressed the importance of such a plan in tieing the employe closer to the company and in improving employe-employer relations generally through proving the company interest in the welfare of its employes.

He then explained the workings of the plan and how it is administered, and he urged that all members not presently insured come under the plan. Thusfar, after three years of operation more than 3000 people including employes and their dependents have been so insured. To date, more than $185,000 has been paid out in claims of which more than one-half was paid out in 1955.

Mr. Moore has had innumerable benefits from the plan, including peace of mind and better employe relations which he urged others to seek.

(Continued on page 138)

After drilling and blasting operations are finished, "C" Rear-Dump moves in to begin clean-up. Daily, the three machines move 1 "round" or 1000 tons of loose limestone. At this rate, tunnel advances about 12 lineal feet per day. In the confined underground tunnel, "exhaust scrubbers" (shown on this machine) made exhaust gas harmless.

Here's where maneuverability really pays off!

Recently the Riverside Cement Co., Los Angeles, California, began tough tunneling operations in their underground limestone quarry at Crestmore, California. Handling all hauling on this project are 3 C Tournapull Rear-Dumps.

Extremely cramped quarters, adverse grades, long hauls on narrow, winding roads, are major problems testing men and machines every day. However, the rugged "C" Rear-Dumps are doing an outstanding job on this rough assignment. Pictures on this page show how "C's" maneuverability pays off when meeting difficulties like these.

Working in extremely cramped quarters like this, big machines turned in dump position which moves rear wheels forward for extremely short wheel base. "C" in "dump position" (shown in this picture) can turn within 20' 8". Its 11' 4" height and 11' width gave ample clearance for the tunneling operation shown here.

Loaded in 6 to 7 passes of 1½-yard Marion shovel, Rear-Dumps averaged 18 tons of limestone per load. 10'4" overall width-of-bowl gives dipper a big "target", makes loading faster, and easier. Minimum spillage was a major advantage in the tunnel work. These "C's" have 18-ton capacity. The new model "C" has 22-ton capacity.

Floor of this tunnel has 10% adverse grades (7% on curves), making for heavy hauling in close quarters. Torque converters on units automatically balance power to load, make operation easier for operator, cut loss of momentum in shifting, prevent killing engine by inexperienced drivers. They also cut shocks in power train and reduce maintenance.

On the entire 6600' cycle, units had only 500' of level haul. The entire route was narrow and winding. Multiple disc air brakes, using 3,763 sq. in. of braking surface, made maneuvering easy . . . gave operator more confidence on narrow turns. Push button electric controls also contributed to ease of operation and safety.

At a touch of a switch by operator, hoist motor is activated. Body lifts quickly . . . 18-ton load is dumped easily and fast. Body swings below and behind rear wheels, preventing material from piling under unit. Front wheel drive gives operator control of unit at all times, even when dumping over edge of steep embankment like this.

Tournapull—Trademark Reg. U.S. Pat. Off. R-873-Q-b

LeTourneau-WESTINGHOUSE Company

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Los Angeles Strike

DETAILS OF THE 90-DAY STRIKE involving producers of sand, gravel and ready-mixed concrete in Los Angeles county were discussed before a joint session by Vernon E. Lohr, California Materials Co., Whittier, Calif. Mr. Lohr was chairman of the collective bargaining committee set up by the Los Angeles associations to represent the 29 companies which were struck by the Teamsters Union and which represent 90 percent of the capacity for ready-mixed concrete and aggregates in the affected area.

The main point of issue was the union's demands that the industry subscribe to a union-controlled and administered pension plan, requiring the payment of 10 cents per hour for each employe into a fund. Such funds would be under the control of the Seattle, Wash., office of the Teamsters which represents many types of industries.

The strike stopped a half billion dollars worth of construction, idled 600 union members and eventually some 100,000 construction workers.

September 30, 1955, was the expiration date for the contract and, following a host of demands by the union which, said Mr. Lohr, be-clouded the pension issue, the companies made a final offer of 15 cents per hour and 2 cents in fringe benefits.

Pickets were thrown around the plants on October 3, and the companies drew up a program of action involving legal considerations and a program of public relations. The producers took federal court action. They filed charges of unfair labor practices, charging coercion and violation of the Taft-Hartley Act. The union was sued for $5 million per month damages.

A program of public relations was started by the producers, stating the conditions and their position in the newspapers, and providing the facts to employes, customers, contracting agencies and the general public through the use of employe letters, advertisements and news releases. This information was disseminated from the start of the strike and had its effect when the impact of the strike started to be felt.

The union accused the industry of wanting the strike for purpose of tax benefits and made all sorts of charges and attempts to break the unity of the companies. The companies held regular weekly meetings, or oftener, throughout the strike, and countered every charge and move by the unions. For example, with mounting pressure to keep school and vital flood control construction going, the producers offered to make available 1½ million tons of processed materials if the union would permit customers to come and get it. This offer in the public interest and the union's refusal to cooperate were given wide publicity.

Two portable plants, and non-striking but distant operations, shipped a modest amount of material into the area during the strike. Hauls were up to 125 miles by truck with concrete costing the purchaser up to $30 per cu. yd. and aggregates $8 per cu. yd.

Public resentment grew as unemployment increased. The purchasing power of some quarter million people was hit, automobile sales dropped, cars were repossessed, etc. Wives and teamsters organized and held meetings in efforts to break the strike. The 100,000 non-striking craftsmen out of work, as a group, built up a resentment to the union. The companies in their effort to stop the strike tried many suggestions including drawing up their own pension plan for the future.

After the N.L.R.B. indicated in mid-December that it would take action unless the unions removed their pension demands, the strike was on the way to settlement. A principle of arbitration was set up for later action and, on January 3, 1956, the men started back to work accepting the final offer of the companies.

The group conceded nothing and remained united throughout in its belief that it was resisting unreasonable and illegal demands of far-reaching significance. Its stand showed the power of industry group action and demonstrated to unions that a group of small companies can stick together and not sacrifice principles.

Controllers' conference panel members, left to right: John T. Sapienza, tax counsel for the associations; J. H. Reid, Standard Paving & Materials, Ltd., Toronto, Canada; Paul J. Kremer, Buffalo Slag Co., Buffalo, N. Y.; Eugene J. Halter, J. K. Davison & Bro., Pittsburgh, Penn.; and Henry H. Kirwin, Eastern Rock Products, Inc., Utica, N. Y.

Labor Negotiations

Following the account of the Los Angeles strike, there was a panel discussion of labor negotiations in key areas in 1955.

Norman J. Fredericks, Koenig Coal and Supply Co., Detroit, Mich., told of industry negotiations in his area and actions taken that avoided a strike. In the Detroit area, negotiations are through the Transit Mixed Concrete Institute of Metropolitan Detroit which is the exclusive agent of all members with power to act.

At expiration of the contract on January 31, 1955, the union asked for an entire new contract which would eliminate all old agreements. A guaranteed work week, new showup clauses, a pension plan and many objectives detracting from management's rights were involved. Dealings were with a top official of the Teamsters Union. Following 18 meetings on issues far apart, the industry ended up with one thing it desired which was a long-term contract (6 yr.). Wage increases granted were 12 cents per hr. the first year, and 8 cents for each of the second and third years. At three years, wage negotiations only may be reopened.

Vacations were liberalized and a 6-hr. daily guarantee was granted if a man reports to work. No 48-hr. per week guarantee was agreed upon. The industry is paying $2 per week per employe into the union's Central States Pension fund, into which the automotive and other industries have been paying for several years. The industry could not match the union proposal and decided to go along for that reason and because the figure is a fixed, known amount.

James A. Nicholson, Nicholson Concrete Co., Toledo, Ohio, discussed the 1955 strike involving the ready-mixed concrete and concrete block industries in Toledo which lasted three weeks.

Demands included a welfare and new pension plan, liberalized paid vacations, a "hot cargo" clause, a guaranteed 8-hr. day, super-seniority

Ohio quarry tells *how to speed up* YOUR loading operations!

As soon as TraveLoader loads one truck, cross-conveyor is shifted to opposite side by operator from the driver's cab. Loading continues into waiting truck without interruption.

TraveLoader moves forward in any one of several working speeds . . . revolving feeder places a continuous flow of material on conveyor belt . . . any size truck is loaded in seconds.

The Karch Stone Co., of Celina, Ohio, stepped up their loading when they added a self-propelled, belt-type TraveLoader to their fleet. Now, after months of tough loading to state, county, and private trucks, Company President George Karch reports, *"The TraveLoader loads twice as fast as bucket-type loaders."*

Loads 8-ton trucks in 40 seconds

At the Karch quarry, 18 to 20 different specification aggregates are handled everyday. Materials range from lime to 3" rock. Working in any of the material stockpiles, the TraveLoader loads 6½ yds. in about 40 seconds, according to Mr. Karch. Bucket-type loaders working in the same material were timed at an average of 99 seconds. Recently, after the TraveLoader moved 2300 tons of crushed stone in one day, Mr. Karch commented, *"No other loader compares with the TraveLoader."*

Cross-conveyor balances load

The TraveLoader's screw-type feeder automatically adapts itself to the load ahead and keeps a continuous flow of material moving on to the conveyor belt. Cross-conveyor (optional equipment) loads trucks on either side. In stockpile loading, no time is wasted waiting for trucks to get into an exact loading position. Cross-conveyor may be shifted to truck's position, either side, by hydraulic control from the cab. This flexibility of loading conveyor also makes it easy to balance truck loads sidewise. Optional deflectors on ends of cross-conveyor give better balanced loads in trucks of all sizes.

Operator's cab centrally located

When loading, the Traveloader's centrally located cab . . . up out of the dust . . . gives operator clear visibility in all directions. Operator has full vision of feeder screw, conveyor, cross-conveyor, and truck. Loading is uninterrupted. When one truck is loaded, operator shifts cross-conveyor and material pours into waiting truck at other side. No front-end loader (with its lost motion in truck to truck turn-and-travel motion) can match the ease of operation, and fast loading obtained with TraveLoader. Find out how this rugged loader can cut delays on your loading, increase your loading capacity, decrease your loading costs. Ask your LeTourneau-Westinghouse Distributor for complete specifications.

AL-13-M-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

clause, extra pay for after-shift work, an inflexible work week schedule, 5 days off with pay, a week's notice of layoff or payment, preferential seniority for overtime, that no supervisor be permitted to do ordinary work, the providing of individual lockers for employes, payment for union stewards while holding meetings and payment of double time the rest of the day if a man works more than 5 hr. before having lunch.

Most of the demands were rejected in the negotiations, which finally wound up with the highest wages paid by the ready-mixed concrete industry in Ohio. A compromise was made on the matter of vacations and the pension plan was dropped. The companies agreed to make credit union deductions. The salary scale is $2.28½ per hr. and higher. Details of the demands and settlement were covered in articles by Mr. Nicholson published in ROCK PRODUCTS, October, 1955, p. 214.

Mr. Nicholson, in his summary, said that management must be better prepared and resist patterned area contracts, must be prepared to accept strikes and stick them out, bring demands of its own to the bargaining table, meet unions on equal grounds, work together with allied industries and that associations must double their efforts in the labor-relations field.

Raymond F. Powell, Concrete, Inc., St. Louis, Mo., in telling of the 13-day strike in his area, said that wages, which were based on the size of loads, have now been standardized at a uniform figure.

He said that it is time the industry cease being surprised at the extent of union demands, and that the solution is in the forming of tighter associations, cooperation and in having competent negotiators. Employers, he said, are at a disadvantage at the bargaining table where the union is out to teach the industry a lesson for resisting. Efficient negotiations are required to represent the producer in quick conferences. Discussion developed that these negotiators must be enlisted from the ranks of the industry.

Industry Wage Pattern

SPEAKING BEFORE A JOINT MEETING of the two associations on the subject, "The Industry Wage Pattern in 1955," assistant executive secretary Kenneth E. Tobin, Jr., summarized results of a survey on labor relations developments in 1955 based on 70 detailed replies received from a request made to 71 representative companies.

The replies indicated a substantial similarity in many basic matters due to the predominance of Teamsters Union contracts in effect. At least a portion of the production of 55 of 70 reporting companies are represented by labor unions, the great majority of contracts being with various AFL-CIO unions. Of the 55 companies, 51 have contracts with the Teamsters, and in the case of 14, the Teamsters are the only union in the plant.

As usual, the unions made fantastic demands for wage increases in 1955, ranging from 25 to 60 cents per hour, supplemented with other demands including all manner of fringe benefits. There were more strikes in 1955 than in 1954. Lengthy ones occurred in Los Angeles, Calif., Fort Wayne, Ind., and Reno, Nev., and 18 strikes of shorter duration were reported.

Sixty-one of 70 companies granted increases in the straight-time hourly rate in 1955, the average being 11 cents per hour, with little deviation from the average figure. This compares with 10 cents in 1954 and the 1955 average increase of 12 cents per hour for all industry.

The exception as far as the national average is concerned was New England where increases ranged from 8 cents to 45 cents per hour and averaged 24 cents per hour.

As far as fringe benefits are concerned, about 95 percent of the companies in the two industries have vacation plans. The trend is toward liberalization of these plans, in recent years toward three and four weeks vacation after service over five years and to two weeks' vacation after two or three years of service. During 1955, three weeks' vacation after 10 years' service was added to many contracts and four weeks' vacation after 15 or 20 years is now in a few contracts.

About 75 percent of all companies in the industries give two or more paid holidays, the figure ranging from 3 to 11 with an average of six.

The unions' national campaign for a guaranteed work week in 1955 resulted in 14 of 55 correspondents having that provision in their contracts. Most are for 40 hr. although a few provide for 44 hr. and two provide for 48 hr. There were several demands for a guaranteed annual wage, to which no companies have agreed.

Sixty of the 70 reporting companies have health and welfare plans, and 17 of them increased their contribution in 1955. The Group Insurance Plan of the associations, said Mr. Tobin, continues to grow as member companies succeed in having unions accept it in place of contribution to a union health and welfare fund. White collar employes are eligible under the association plan.

Ten of the 70 companies reported installation of pension plans in 1955 as a result of union pressures.

Scattered instances were reported of new provisions for premium pay on Saturdays, Sundays and holidays; five companies added provisions for premium pay for work done after certain hours in the day, and 10 companies reported increases granted in established shift differentials.

During 1955 the Teamsters initiated a drive to force acceptance of a "hot cargo" clause, and contractural acceptance in advance of a multi-state or state area agreement. The "hot cargo" clause calls for complete surrender of basic obligations of management. Seventeen of 51 correspondents with Teamsters' contracts received demands for inclusion of this clause and seven of them now have the clause in their contracts.

Twelve correspondents were confronted with demands for acceptance of a multi-state agreement and nine successfully rejected the demand.

Labor agreements in the two industries have been traditionally for one year's duration, but in recent years the trend is toward agreements for longer periods. There are many 2-year contracts in effect, a few 3-yr. contracts and an occasional 5-yr. contract. Most of these contracts provide for re-opening of the contract only for wage negotiations at the end of one year. Others establish the wage increases to become effective during the life of the contract, usually at year intervals. A few remain in force as drawn until expiration.

In conclusion, Mr. Tobin said that companies are enthusiastic about benefits to be derived from area bargaining with other members of the two industries, and he warned that unions will continue their drive for higher wages and further benefits without regard for economic realities and capacity to pay.

Manufacturers Division

Annual meeting of the Manufacturers Division was held February 10, preceding the conventions, with chairman R. P. McKenrick, Blaw-Knox Co., Mattoon, Ill., presiding. Discussion was almost entirely concerning the exposition, and the reports of the various committee chairmen were heard.

Certificates of appreciation, engraved and framed, were presented to all who have served as chairmen of the Division through courtesy of General Electric Co. V. P. Ahearn invited all associate members to participate in

(Continued on page 144)

New bucket elevator components by CHAIN Belt match today's heavier cement mill demands

Best chains ever designed for elevator service!

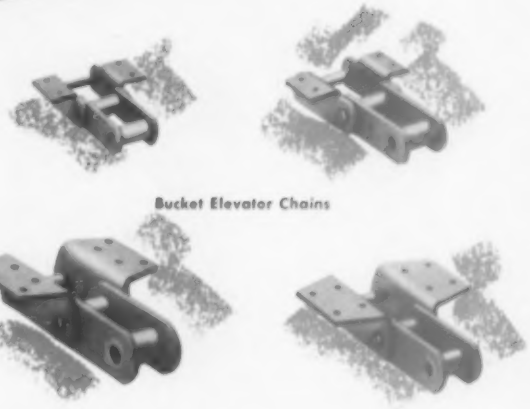
To meet the demands of greater capacity and longer operating hours of modern cement mill bucket elevators, CHAIN Belt Research developed new and improved chains of greater strength and durability, especially for cement mill service.

BALANCED DESIGN . . . All chain parts balanced for utmost strength, lightest weight. Less dead weight, less bulk . . . take less horsepower to move than other chains for this service.

MAXIMUM WEAR-LIFE . . . High quality steels, proper heat-treatment, controlled press fits, plus fine workmanship assure maximum wear-life.

ACCURATE PITCH . . . Close tolerances and controlled fits maintain accurate pitch for long, top performance. Wide links and generous attachment length provide extra support for modern, big-capacity buckets.

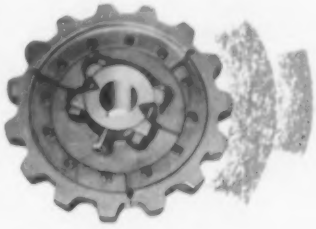
Used on any installation, you can expect more for your chain dollar — more service, capacity, efficient operation when you choose new Rex Elevator Chains!



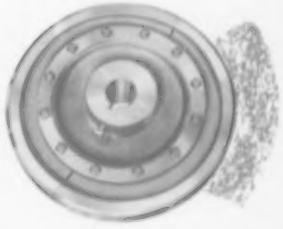
Bucket Elevator Chains

Segmental rim sprockets, traction wheels cut down time

The tough, long-lasting hardened cast steel rims on these sprockets and traction wheels simply bolt on. When replacement is necessary, only the rim is replaced. Down time is cut to hours, not days. Sprocket rims are machined on two sides — may be reversed to give double life. Hubs are available in split or solid design.



Segmental Rim Sprockets



Segmental Rim Traction Wheels

New bucket design gives large capacity, long service

Designed especially for the new stronger chains, these buckets have many new design features. The style AC, for instance, features a hooded back that gives efficient discharge on continuously spaced installations. It also has a high front that increases its capacity for handling free-flowing materials. Another feature is the special air vents in the bottom that prevent trapping during loading and unloading of fluffy materials.

These buckets will give longer service under rough cement mill treatment. Tough Rex High-Grade Malleable Iron is used. Extra thick bucket walls are provided for greater strength, longer wear. Buckets are designed to give you more efficient, increased-capacity handling of all materials.

Rex Style AC Bucket

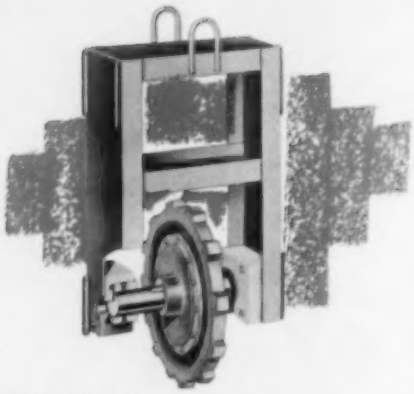
Rex Style AA Bucket

TURN THIS PAGE FOR MORE INFORMATION

CHAIN BELT COMPANY

LEADERSHIP . . . through creative engineering

CHAIN Belt gives you a full line of products for economical cement mill service



Internal gravity take-up

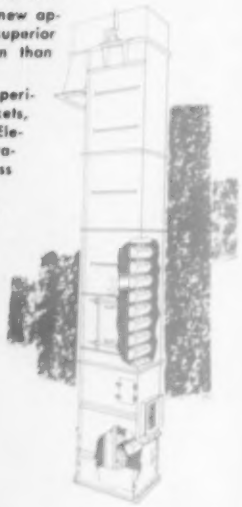
Another Rex development, this gravity take-up automatically compensates for chain and sprocket wear and temperature variations . . . lengthens life of chains, sprockets and bearings. The welded steel frame floats freely in an upright guide inside the elevator casing. Internal mounting insures a dust-tight boot section. Bearings are heavy-duty, heat-treated tool steel sleeves for long, trouble-free service.

For modern cement mill service — REX RATED Centrifugal Discharge Bucket Elevators

The ultimate in bucket elevator design! A completely new approach to elevator design makes the REX RATED Elevator superior for economical, dependable, greater capacity operation than ever before.

Rex Engineers combined modern elevator design and field experience with new components — bearings, chains, buckets, sprockets, take-ups — to bring you the first "Balanced Design" Bucket Elevator. These elevators are matched to modern cement mill operations — they have greater capacity, will work longer with less maintenance, give you more service at lower costs.

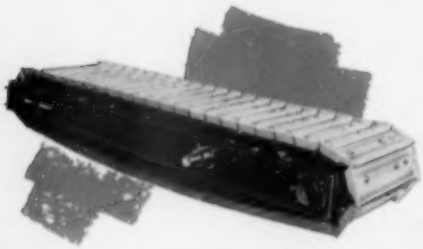
REX RATED Centrifugal Elevators take little space — save valuable floor area. They are economical to construct. And because they are balance designed, they make down time and production lags a thing of the past.

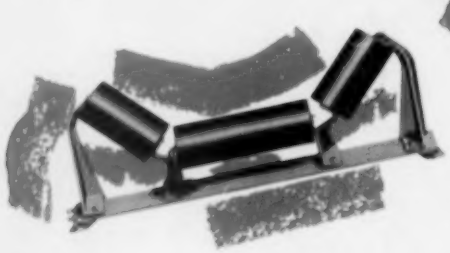


Shafer Self-Aligning Roller Bearings

The unique Shafer Bearing combines the best of roller and ball design. The result is a tough, high load-carrying bearing that provides a high degree of self-alignment. To this feature is added a built-in Micro-Lock that provides easy adjustment for simple installation and maintenance.

Another feature of these bearings is a special "Z" Housing Seal that keeps lubricant in and dirt out. All the features of the Shafer Bearing combine to give more economy, longer service, more efficient operation on any cement mill job.





Look to CHAIN Belt, too, for feeders, belt idlers

CHAIN Belt offers a complete line of other bucket elevators, components and bulk materials handling equipment. Here, for example, are Rex Apron Feeders and Rex Belt Idlers.

For perfect production control, Rex Apron Feeders give you a uniform, metered feed rate. No underfeeding; no overfeeding. You can count on regulated flow at all times. And these feeders are made to handle a wide capacity range at top efficiency . . . take hot or cold material.

Rex Idlers like the bucket elevators are REX RATED to match the job. They are famous for their long, dependable operation and easy servicing features. Rex Idlers are quality made with labyrinth seals . . . roller bearings . . . unit inner-tube mounting — all to assure low power consumption, long life and smooth rolling.

CHAIN Belt Company
4649 W. Greenfield Ave., Dept. RP-2
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- ☐ Send informative catalog on REX RATED Centrifugal Discharge Bucket Elevators.
- ☐ Send informative literature on Rex Bucket Elevator Components.
- ☐ Please have a CHAIN Belt District Sales Engineer call.

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the Los Angeles convention, February 11-14, 1957.

C. B. Laird, Eagle Iron Works, Des Moines, Iowa, was elected chairman of the Division. Vice-chairmen are D. McM. Blackburn, Hendrick Manufacturing Co., Carbondale, Penn.; J. C. McLanahan, McLanahan & Stone Corp., Hollidaysburg, Penn.; W. A. Rundquist, Pioneer Engineering Works, Inc., Minneapolis, Minn.; E. D. Stearns, Barber-Greene Co., Aurora, Ill.

The board of directors comprises: Emil Deister, Jr., Deister Machine Co., Fort Wayne, Ind.; John E. Dunn, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.; H. F. Lawrence, The W. S. Tyler Co., Cleveland, Ohio; John F. Steffens, Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.; M. W. Talcott, W. O. & M. W. Talcott, Inc., Providence, R.I.; Austin K. Thomas, Chain Belt Co., Milwaukee, Wis.; R. B. Utt, Western Machinery Co., San Francisco, Calif.; Roy K. Wills, Construction Equipment Div., Baldwin-Lima-Hamilton Corp., Lima, Ohio.

Wage-Hour Act—How It Applies

CHAS. A. HORSKY, counsel for the associations, Washington, D. C., delivered a paper entitled, "Do the Federal Wage and Hour Laws Apply to Your Employees?" Mr. Horsky discussed several facets of the Wage-Hour Act, such as basic coverage, white-collar exemptions, record keeping, and basic rates, as well as other related federal statutes like the Walsh-Healy and the Davis-Bacon acts.

The speaker said that recent developments in the Wage-Hour Act are in the direction of expanding the coverage, not contracting it. Basically the coverage relates to interstate movement of products, and applies to sand and gravel and ready-mixed concrete which moves across state lines, or is used in the manufacture of products which move across state lines. Another area of coverage, as handed down by a Supreme Court decision in 1953, involves so-called "instrumentalities of commerce," i.e., employes engaged in producing aggregates and ready-mixed concrete for use locally (in the same state) in the repair, maintenance, or reconstruction of so-called "instrumentalities of commerce" — roads, bridges, highways, railroads, airports, pipe lines, etc., are to be covered by the Act.

Mr. Horsky outlined three areas wholly or partially excluded by the Wage-Hour Act, including:

1. Sand and gravel and ready-mixed concrete companies which do an "essentially local business".

2. Employes engaged in furnishing materials for "new construction" of facilities not yet in use as instrumentalities of commerce or as producers of goods for commerce.

3. Employes engaged in furnishing materials for maintenance, repair and improvement of plants or factories, even if these plants are engaged in production for commerce.

In the first two categories, he remarked, there remains the question as to what constitutes "local business" and "new construction." He pointed out that regarding "local business", there is really no clearcut, automatic formula to follow; rather, it appears that a practical judgment will be required in each case. Mr. Horsky referred to several recent court decisions pointing out inconsistencies in this matter. In one case, Hayward v. Graziano, 28 Labor Cases Par. 69.491 (D. Mass., Sept. 30, 1955), the plaintiff, working for a company doing "essentially local business," recovered 13 weeks of overtime wages for working during that period on jobs involving interstate commerce and "instrumentalities of commerce." The conclusion from this case is that *some* liability under the Act may exist for an "essentially local business" — when for a period its business gets into an area which is not "essentially local." Consequently, the speaker recommended that companies keep good records as to duration of these "non-local" jobs.

Uncertainty also exists as to what constitutes "new construction." The speaker referred to a Supreme Court decision in June, 1955, Mitchell v. Vollmer, 349 U.S. 427, in which construction of an earth work embankment and a concrete platform for the Algiers lock and canal near New Orleans (a new facility which had never been used in commerce) was declared to be covered by the Act. The reasoning was that the work was "directly and vitally related to the functioning of an instrumentality or facility of interstate commerce so as to be, in practical effect, a part of it, rather than isolated local activity." The implication from this decision, the speaker said, was that groundwork was laid for asserting broader coverage of the materials industries by administrative interpretation, and that the "new construction" doctrine may be on the way out entirely.

Mr. Horsky urged producers to be very careful in taking the risk that they are not covered by the Act, since the penalty is stiff. He also stated that the Administrator has an increased appropriation for enforcement, and that 14 new wage-hour regional offices will be opened this spring.

Regarding white-collar exemptions, the speaker expressed the belief that the minimum salary stipulation for executive, administrative, and professional employes, to be exempt from the Act, would be raised, possibly as early as March 1 or soon thereafter. Labor spokesmen are urging that the salary test for executives be raised from $55 to $100 per week, and for administrative and professional employes, from $75 to $125 per week.

Mr. Horsky also discussed basic rates under the Wage-Hour-Act. He reported that in August, 1955, the regulations were published by the Administrator, and that "basic rate" computations of overtime are now possible. However, he warned that this method should be regarded with extreme caution. On its face, he said, it sounds like the answer to a host of questions — the employer and the employe agree on a "basic rate" and there is no worry about anything except multiplying it by one and one-half. In actual fact, however, the use of the "basic rate" technique is hedged about in the regulations with so many qualifications and so many refinements that there is very real doubt that it will really be a method of simplifying problems.

He stated that the regulations include ten general conditions which must be met before any "basic rate" computation can be used, and also five types of authorized "basic rates" which are available. He recommended that if producers are interested in the method, they should study them very carefully to be sure that their plan qualifies under all the tests.

He added, "The 'basic rate' theory does not permit agreement on a 'basic rate' which will be, over a period of time, less than the employe's average straight-time rate. It does not, of course, permit a 'basic rate' which is less than the statutory minimum. It does not exclude the necessity of computing extra overtime on certain forms of additional pay, such as regular bonuses, commissions, shift differentials, and the like. It may be useful for salaried employes who work fixed workweeks, but it is far from a panacea."

Next Mr. Horsky discussed other federal labor standard statutes relating to government construction or supply contracts. The Davis-Bacon Act applies to federal construction contracts of over $2000 for alteration and/or repair of public buildings or public works of the United States and Dis-

(Continued on page 178)

STURDY, EASILY HANDLED CONTAINER makes "Nitramite" loading a simple task.

New low-cost Du Pont "NITRAMITE"® offers high-strength action in hard and soft materials

Du Pont "Nitramite" is the new medium-density member of the dependable line of Du Pont blasting agents. You'll like its economy and excellent blasting action in both hard and soft materials. "Nitramite" provides high strength at low cost whether you're shooting in granite, limestone or any other type of quarry.

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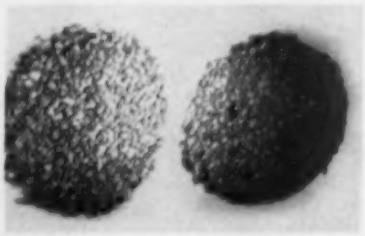
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

OPERATING Practices Pointed to Improved Quality of Product

A PAPER ON "CLASSIFYING SAND WITH WATER" was presented by E. L. Shoemaker, director of engineering and purchasing, Warner Co. E. K. Davison presided over this session in the absence of Louis P. Struble, Jr. Mr. Shoemaker opened his remarks by quoting Nathan C. Rockwood, consulting editor, ROCK PRODUCTS, as to the tighter trend in sand specifications. He described three types of sand specifications. One is based on a straight sieve analysis. A second, based on sieve analysis and F.M., was referred to as a highway specification of 2.25 to 3.3 F.M. The third type was a sieve analysis with an F.M. specification above or below a stipulated modulus. A slide was shown of a synthetic and a natural sand.

Mr. Shoemaker, by means of slides, showed the present facilities at their Van Sciver plant for production of sand. This operation uses a ladder-type dredge loading to barges. Barges are unloaded at the plant with a bucket elevator to deliver material to a two-deck screen. Throughs are sent to a launder in the bottom of which was a stationary slotted screen. The throughs go to Wemco screws for the production of plaster sand. Plus material is sent to an 18- x 40-ft. sump with a bucket elevator to deliver material to concrete sand bins. Gravel goes to screens from which a cut of ¼-in. to ⅜-in. could be bled into the concrete sand. Overflow from the sump is sent to a hydro-separator with the underflow returned to the sump. Overflow from the screws also goes to the hydro-separator and the overflow is wasted. The launder, previously mentioned, handles 10,000 g.p.m. of pulp; equivalent in sand to 7 to 8 t.p.m.

The speaker said that two schemes were under consideration for re-vamping the sand plant. Much of the plant will remain as now except that three more screws will be added to recover sand which will be stacked over a reclaiming belt for blending purposes. Under one plan, a normal sand would



Synthetic sand, to the left, and natural sand, to the right, are similar

be produced and sent to a 100,000-ton surge pile over a reclaim belt. A second coarse sand and a third fine sand pile (both same size as the first) would be produced. These three sizes are then blended as needed to make the finished sand. One of these plans is shown in the illustration.

Under the third proposal, six sizes of sand would be produced and stocked in separate piles over a reclaiming tunnel. Two sizes would be prepared by screening and the remaining four by overhead classifiers. No details were given as to the type of classifiers.

Exploring Sand and Gravel Deposits

Different methods of sampling gravel deposits, including driving pipe, auger types, pump, and rotary equipment, were outlined by R. W. Wilson, Pennsylvania Drilling Co., who pinch-hit for Frank C. Sturges, vice-president of the same company. He showed a double-tube sampler and types of machines used for under-water and land explorations.

Abrasion Resistant Materials

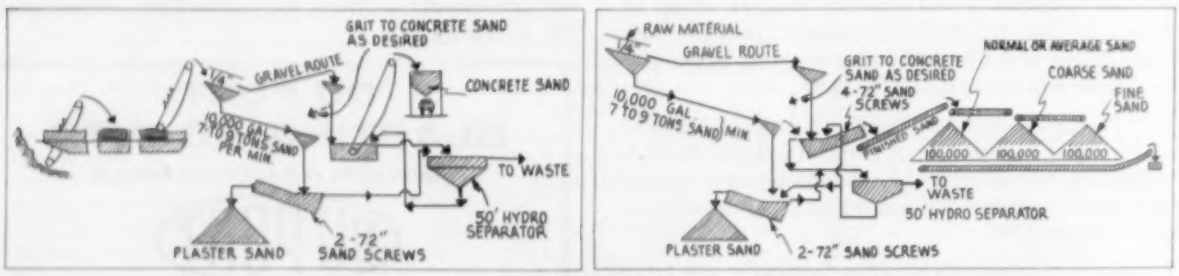
A paper on "Abrasion Resistant Materials used in Sand and Gravel Production" was presented that was prepared by W. L. Price, engineering manager, Keystone Division, Dravo Corp., Pittsburgh, Penn., and D. H. Marlin, research engineer, department of research and development for the same company.

In his opening remarks, Mr. Price outlined the scope of the problem saying that abrasive wear accounts for about 75 percent of the maintenance dollar for the producer of sand and gravel. He said the cost for abrasive wear alone in the United States for the sand and gravel industry was in the $25,000,000 to $50,000,000 per year range. He outlined the theories of mechanical wear, dividing them into two categories; abrasion and impact, but pointed out that most types of wear due to sand and gravel are a combination of the two. He stressed the effect of velocity of a sand particle striking a surface and said that a particle of sand travelling at 60 f.p.s. actually can develop a surface stress of 100,000 p.s.i. The speaker described in considerable detail the action of true impact wear, surface stresses, compressive yield strength, metal ductility and surface hardening due to impact and what happened to wearing surfaces under these conditions.

True abrasion, the speaker said, was more of a scratching action, and he divided this action into two subdivisions; high stress abrasion and low stress abrasion. To illustrate the former he used the crushing action of a gyratory crusher, and the low stress by sand sliding in a chute.

Mr. Price showed slides of the micro-structure of various metals which showed that the metal is not uniform

(Continued on page 148)



Left: Existing sand facilities at Van Sciver plant. **Right:** One scheme for revamped sand facilities

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Accelerated construction programs call for a 35% increase in cement production by 1959. You're in for some profitable years if you gear your plant to meet the challenge.

Allis-Chalmers Can Help You and Your Consultants

Evaluating your present process should be your first step in expanding. Here is where Allis-Chalmers — with more than 50 years' experience in building and applying cement-making equipment — can help.

Allis-Chalmers is not only concerned with machinery application, but with overall plant efficiency. Increased grinding and burning capacity — better heat recovery — faster clinker cooling — maximum fuel utilization — lower power consumption — maintenance economy — are all vital considerations. Only with this approach can you achieve capacity increase and quality improvement at the lowest cost.

Yes, you get more . . . more engineering co-operation when you specify A-C.

Allis-Chalmers Rotary Kilns

Over half of all cement made in the U. S. is processed in A-C equipment. The reason? Allis-Chalmers has pioneered many major improvements in machinery design. For example, air-cooled kiln feed and discharge ends save rebricking cost and prevent shell distortion. True circle, all-welded construction insures best lining fit, long refractory life. Floating-type riding rings provide flexible support and proper weight distribution.

For complete information, see your local Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

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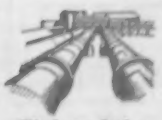
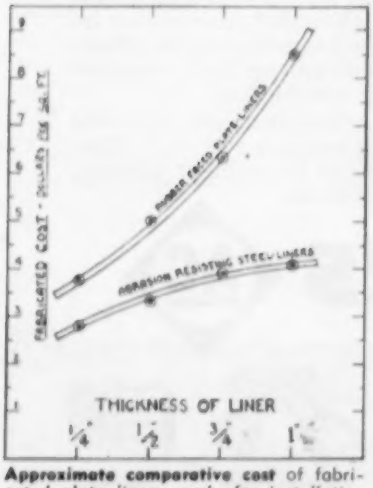

Kiln-Dryers-Coolers

Crushers

Cast austenitic manganese steel dredge bucket after several years use, showing effect of abrasive wear. Buckets contain replaceable cast manganese half-bushing to take pin wear. Manganese buckets will outlast high carbon steel bucket by 1.5 to 2.0 times

in its characteristics but consists of different aggregates of metals similar in appearance to concrete. The metals, he said, consist of aggregate particles of varying hardness bound together by a metal matrix. This part of the paper was a highly interesting and informative section, bringing out the hardness of various metals and how for a given chemical composition, the size, shape and toughness of the microscopic particles can be varied by heat treatment.

The speaker discussed various alloy steels stating that carbon was one of the principal ingredients to increase hardness and such metals as chromium, nickel, tungsten, molybdenum and others are added to increase hardness still further. He classified the available metals in six categories and gave a tabulation comparing their characteristics. The six divisions were: low carbon structural steels, low carbon alloy steels, medium carbon steels, high carbon steels, high alloy steels (work hardenable), and cast irons. These



Approximate comparative cost of fabricated plate liners ready for installation

were all discussed in considerable detail, outlining their properties, which included chemical analysis, hardness, abrasion resistance, impact resistance, weldability, corrosion resistance, etc. Mr. Price also discussed rubber as a wear-resistant material, bringing out its functions from theoretical and practical standpoints. He also discussed tungsten carbide composites, high chromium irons, martensitic irons, cobalt and nickel base alloys, martensitic steels, pearlitic steels and austenitic steels.

The paper was one of the most meaty and valuable presented at any convention, and the authors and the Dravo Corp. are to be complimented for the contribution they have made to the industry.

In the discussion that followed several gave their experiences using rubber. In all cases rubber was more satisfactory than other types of abrasion-resistant materials.

"Tricks of the Trade" Forum

Prior to the convention, members of the association were sent questionnaires asking them to outline their solutions to various operating problems. Speakers on the panel summarized the replies received and gave some of their own solutions.

The first subject discussed was screen blinding. Mel Kerr of American Aggregates Co. said overloading a screen helped cause blinding, and the use of woven wire of the wrong construction also helped increase blinding with emphasis on too heavy a wire being used. Particle shape, Mr. Kerr said, was an important factor and often the tendency for angular particles to cause blinding could be corrected by studying the shape of the screen's openings; square, rectangular, slotted, both vertically and horizontally with respect to the flow of material over the screen. Counter flow vs. direct flow and speed were also mentioned. Punched plate with the diameter of the hole on the underside larger than on the top side was helpful. Ball type trays, cleaners, wire brushing, etc., were included in the discussion and also it was mentioned that stationary plugged easier than vibrating screens. Mr. Kerr told about a screen blinding problem at his company's heavy media separation plant near Detroit that was corrected by the use of wedge-wire, stainless steel panels. Material up to 2-in. diameter passes over this screen that is designed to immediately remove a particle in the minus 2-mm. range. Punched plate is an economical item to use but more area is necessary, it was pointed out. Mention was made of the use of perforated rubber sheeting with a steel backing, and Mr. Kerr said he used a screen of this type with 5/8-in. openings but had plugging troubles.

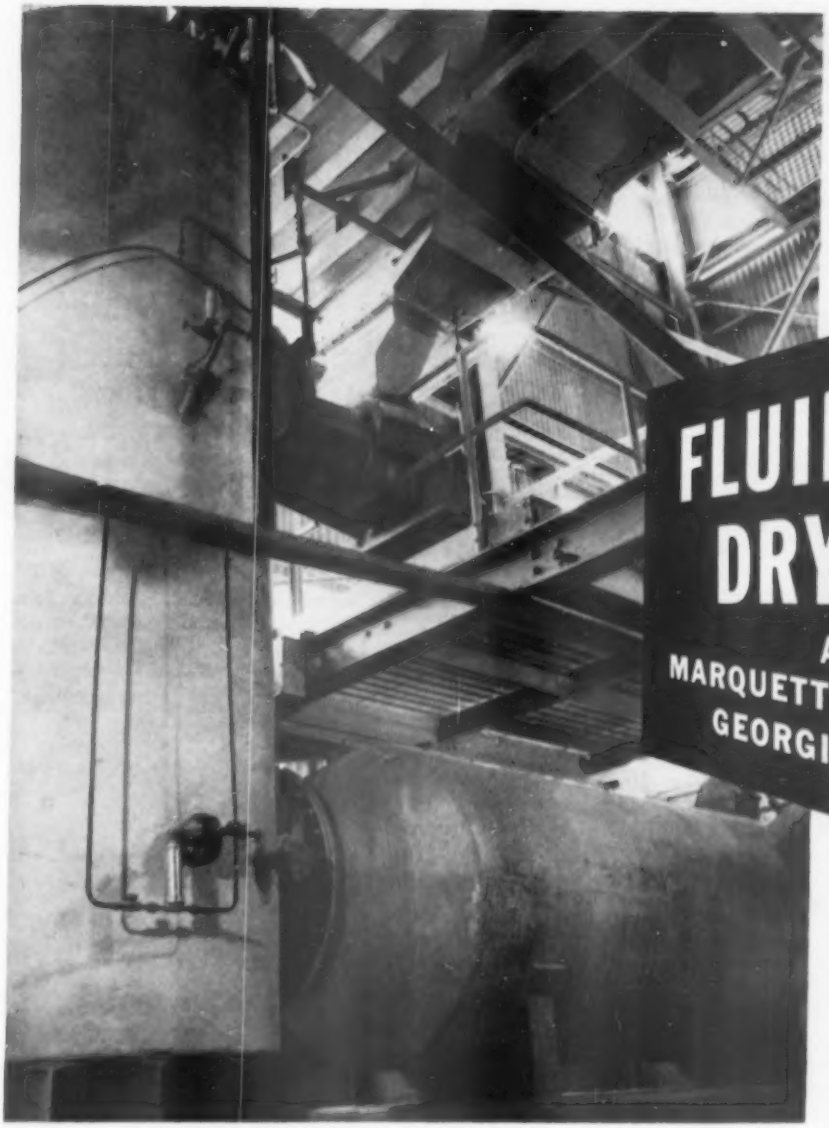
C. G. Cooley, Cooley Gravel Co., Denver, Colo., then described his underwater screening experiences where a No. 16 to $\frac{3}{16}$-in. product was removed. Under-water screens, as described by Mr. Cooley, had a capacity five to ten times that of other types of screen when compared on an equivalent area basis. He solved his troubles in Denver by the use of a loosely woven (Tyler) wire cloth that is the 82-in. dia. outer sand jacket of a rotary screen. He had no accuracy troubles until the cloth was worn badly and blinding was inhibited by the weaving and breathing action of the cloth as the rotary revolved. (In February, 1956, issue of ROCK PRODUCTS is a full description of this operation).

Charles Wick, Chicago Gravel Co., discussed the problem of keeping conveyor belts clean and told of one instance where the snub pulley was put as close to the tail pulley as possible and water sprays washed the material from the belt into a chute and carried it away. Reference to the use of wipers was brief. Segregation of material over reclaiming tunnels was also briefly discussed by Mr. Wick, and it was suggested that manipulating the material over the pile as much as possible to inter-mix and if need be, to use a dragline to rake the material, were helpful.

Aggregate Specifications and Test Methods

A "Review of Progress in Aggregate Specifications and Test Methods," was given by Stanton Walker at the session over which Chas. E. Brady presided. Mr. Walker pointed out that a new look was being given specifications because of new beneficiation methods now available to the industry, and specification writers are led to a more critical consideration of impurity tolerances. On the other hand, he said, there is a growing tendency to a more realistic evaluation of aggregates based on their performances. This was also true of bituminous work. The speaker said:

"There is no doubt but that more and more attention is being paid to uniformity of grading, particularly for fine aggregate. A good example is the apparently loosely drawn specifications for fine aggregate in A.S.T.M. C 33—which are not nearly so liberal as might appear from a quick reading. Quite broad grading limitations are given which are further limited by requiring: (a) not more than 45 percent to be retained between any consecutive standard sieves of the 100, 50, 30, 16, 8, and 4 series; (b) a fine-



FLUIDIZED DRYING AT MARQUETTE CEMENT'S GEORGIA PLANT...

FluoSolids Reactor at left, air heater at right.

Another first for fluid techniques came about early in 1955, when Marquette Cement Manufacturing Company started up this FluoSolids System at their Rockmart, Georgia Plant. Designed to dry ⅜" limestone containing 3.5% moisture, the system processes 40 tons per hour of feed to the raw mills. Compared with the conventional dryer which it replaced, the FluoSolids System has greatly reduced labor and fuel costs at the same time saving considerable floor space.

Other advantages of the FluoSolids System for drying are simplicity and ease of operation and low maintenance due to absence of moving parts in contact with abrasive dust. Start-ups and shut-downs present no problem and the system can produce a dry limestone product from which fine clay has been separated.

For dry process cement manufacturers, fluidization represents a new and better method of de-dusting and drying limestone and cement rock.

For more information write for a copy of Bulletin No. 7502, Dorr-Oliver Incorporated, Stamford, Conn.

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ness modulus within the range of 2.3 to 3.1; (c) a uniformity represented by a range in fineness modulus of not more than 0.20 from the value assumed in selecting the proportions for the concrete."

Alkali reaction with reference to the controversial chemical reaction of the alkali in portland cement and some aggregates was reviewed. Mr. Walker pointed out that A. S. T. M. warns against the use of portland cements containing over 0.6 percent total alkali unless a pozzolanic material is used to inhibit the supposedly excessive expansion due to the supposedly harmful reaction. He mentioned flyash, finely ground calcined shales, some volcanic ashes as pozzolans. He also said that certain types of portland-blast-furnace cements might meet the requirements. And, to quote, "Certainly the newly standardized portland-pozzolans (Type I-P and Type I-PA) would be considered as meeting it," said Mr. Walker. He also reviewed the test methods for determining if an aggregate was reactive or not, pointing out that several methods were available but specifications do not say categorically how to determine if an aggregate is reactive. Evidently the potential reactivity of an aggregate must be based on engineering judgment, the proper interpretation of test results, and an examination of concrete structures. In specifying high flexural strengths for certain types of paving, some of these specification requirements, he felt, were high.

Referring to a test method for determining soft particles and to a "scratch" test adopted by A.S.T.M., Mr. Walker held that the test method may be helpful in controlling the quality of deposits already evaluated by more formal methods but questioned the quantitative significance of the test when used alone. With reference to specification writing in general, Mr. Walker said, "The fixing of limits which are protective and, at the same time, not punitive, is a difficult one that requires information and good engineering judgment."

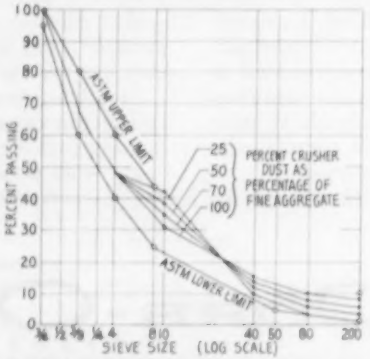
Sawed Joints for Concrete Pavements

"Sawed Joints for Concrete Pavements" was the subject of a paper by John E. Burke, assistant engineer of physical research, Illinois Division of Highways, Springfield, Ill. This was a very timely paper for many gravel producers have been at a sales disadvantage because of their harder aggregates. The speaker reviewed the various methods of making control and/or expansion joints. As of 1954, he said, 13 states were using sawed joints, eight more permitted it as optional, and an additional eight states used it experimentally. The sawed joints gave adequate protection and made for easier riding. He said the spacing of sawed joints was about the same as for other types and gave 15 to 20 ft. as the minimum and, where reinforcing is used, up to 100 ft. as the maximum.

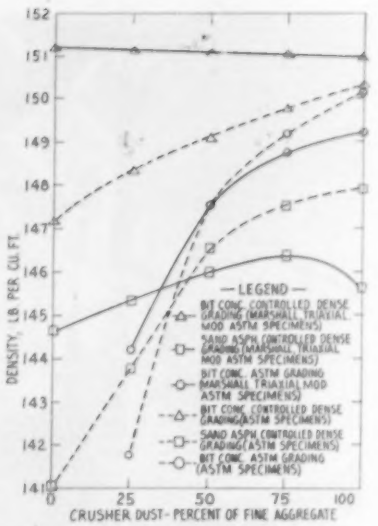
The speaker reported cuts as costing from 10 to 75¢ per lin. ft. with Kansas reporting as low as 2¢ using carborundum blades. Diamond blade life is from 400 to 5000 lin. ft. and this amounts to 3 to 38¢ per ft. of joint. The speaker also translated costs into "costs per ton of aggregates" saying that in Illinois on a 24-ft. wide pavement and a 10-in. slab that 4200 tons of aggregate per mile would be used. In Illinois where a 100 ft. cut interval is made this cost becomes 3 to 23¢ per ton of aggregate and at the 20-ft. interval, the cost becomes 15¢ to $1.13 per ton of aggregates. He illustrated, by comparing two jobs in Illinois; one used a limestone gravel and the other a mixture of limestone gravel, hard siliceous and igneous materials. The latter was 20 to 30 percent of the total. Blade life for the limestone gravel was 1600 ft. and for the siliceous gravel was 700 ft. and with the 100-ft. interval cuts, the costs were 10 and 14¢ per ton of coarse aggregate, respectively. He pointed out that if the cuts had been made at 20-ft. intervals, these costs might be multiplied about five times. He said Kansas reported 10, 27 and 40¢ per lin. ft. of cut when crushed stone and sand mixes were used; (2) for sand gravel mixes, and (3) where chats were used, respectively. Diamond blades were used on all these cuts.

Effect of Crushed Gravel Fine Aggregate On Asphalt Surfacing

"Effect of Crushed-Gravel Fine Aggregate on the Strength of Asphalt Surfacing Mixtures," was the subject of a paper by W. H. Goetz, research

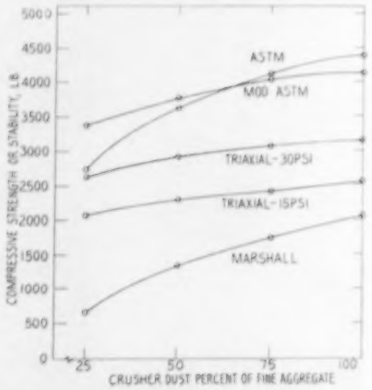


Gradation curves for crusher dust—natural aggregate blends within A.S.T.M. specifications for bituminous-concrete mixtures


DENSITY, LB PER CU FT.
CRUSHER DUST-PERCENT OF FINE AGGREGATE
— LEGEND —
BIT CONC CONTROLLED DENSE GRADING (MARSHALL TRIAXIAL MOD ASTM SPECIMENS)
SAND ASPH CONTROLLED DENSE GRADING (MARSHALL TRIAXIAL MOD ASTM SPECIMENS)
BIT CONC ASTM GRADING MARSHALL TRIAXIAL MOD ASTM SPECIMENS)
BIT CONC CONTROLLED DENSE GRADING(ASTM SPECIMENS)
SAND ASPH CONTROLLED DENSE GRADING(ASTM SPECIMENS)
BIT CONC ASTM GRADING (ASTM SPECIMENS)

Comparative densities of test specimens vs. percent crusher dust

engineer and associate professor, Joint Highway Research Project, Purdue University, and R. P. Lottman, research fellow, National Sand & Gravel



Compressive strength or stability vs. percent crusher dust. Crusher dust—natural aggregate blends within A.S.T.M. specifications for bituminous-concrete mixtures

Association Fellowship at the same university.

It was pointed out that by the use of gravel crusher dust additions to normal sand for bituminous concrete work, the asphalt material increased in strength. Four test methods were used to determine the strength gains; Triaxial, Marshall, A.S.T.M., and a Modified A.S.T.M. If no angular particles are in the coarse aggregates, the deficiencies apparently can be made up by the use of crusher dust and this opens up a new field to the gravel industry, it was pointed out. Angularity and texture of the surface may be factors in the increase in strengths, but it was emphasized that denser grading was a more important one.

(Continued on page 182)

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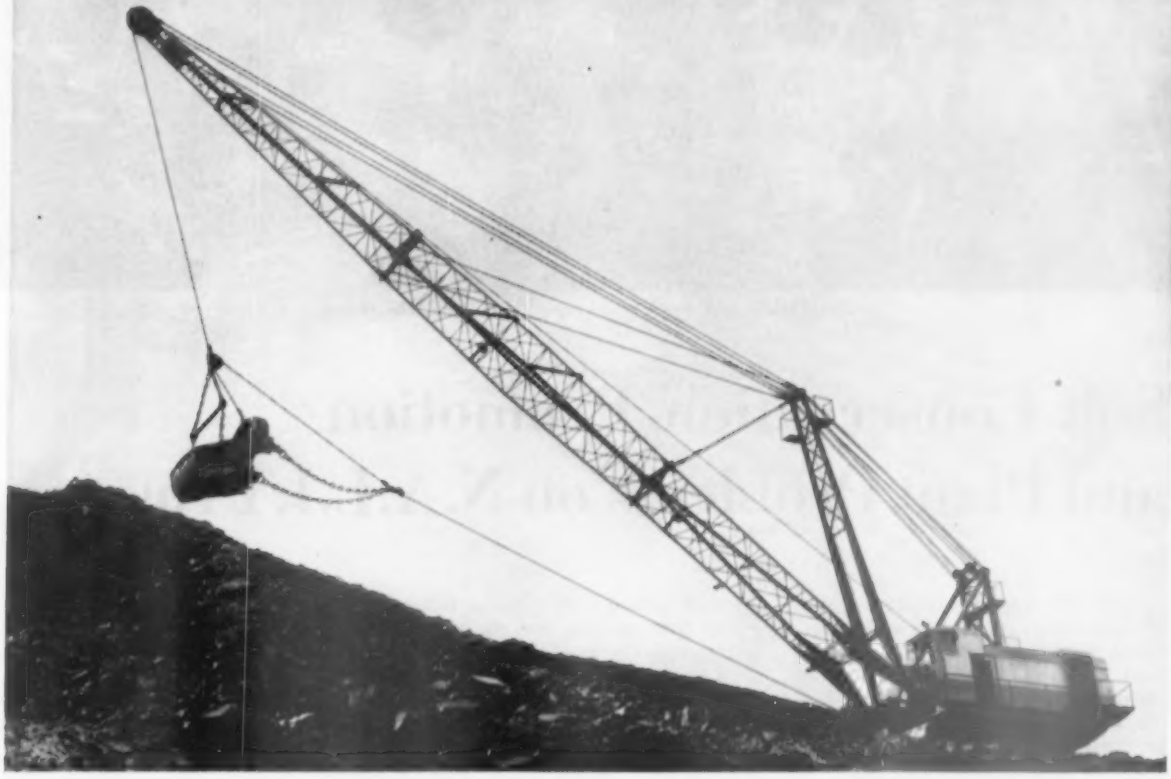

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Your American Cable distributor has draglines, scraper cables, shovel hoist ropes, and winch lines of new VHS in stock now. Just call him and tell him the size and length you want. You don't need any complicated specifications.

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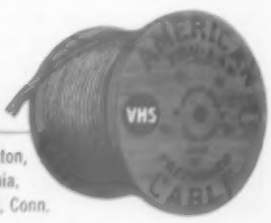


Annual banquet of the National Agricultural Limestone Institute

Soil Conservation, Promotion and Plant Problems on N.A.L.I. Program

ABOUT 300 WERE REGISTERED at the 11th annual convention of the National Agricultural Limestone Institute held February 15-17, 1956, at the Sheraton-Blackstone Hotel, Chicago, Ill. The dates were set between those in the combined conventions of the National Sand and Gravel Association and National Ready Mixed Concrete Association and the National Crushed Stone Association in order that the members have an opportunity to inspect the displays at the biennial expositions of those associations at the Coliseum and Conrad Hilton Hotel.

Sessions of N.A.L.I. were preceded by meetings of the executive committee, the standing committees and the board of directors, and one entire day was set aside during the convention for visits to the machinery exhibits at the Chicago Coliseum where admittance was permissible by badge only through arrangement with N.S.G.A. and N.R.M.C.A.

There were four general sessions. President John H. Riddle, Riddle Quarries, Inc., Salina, Kan., presided for the opening meeting at which all the committee reports and others were heard. The other three meetings were panel discussions, on promotion, plant operations, and on the A.C.P. program. The Manufacturers Division held its annual business meeting and elected officers.

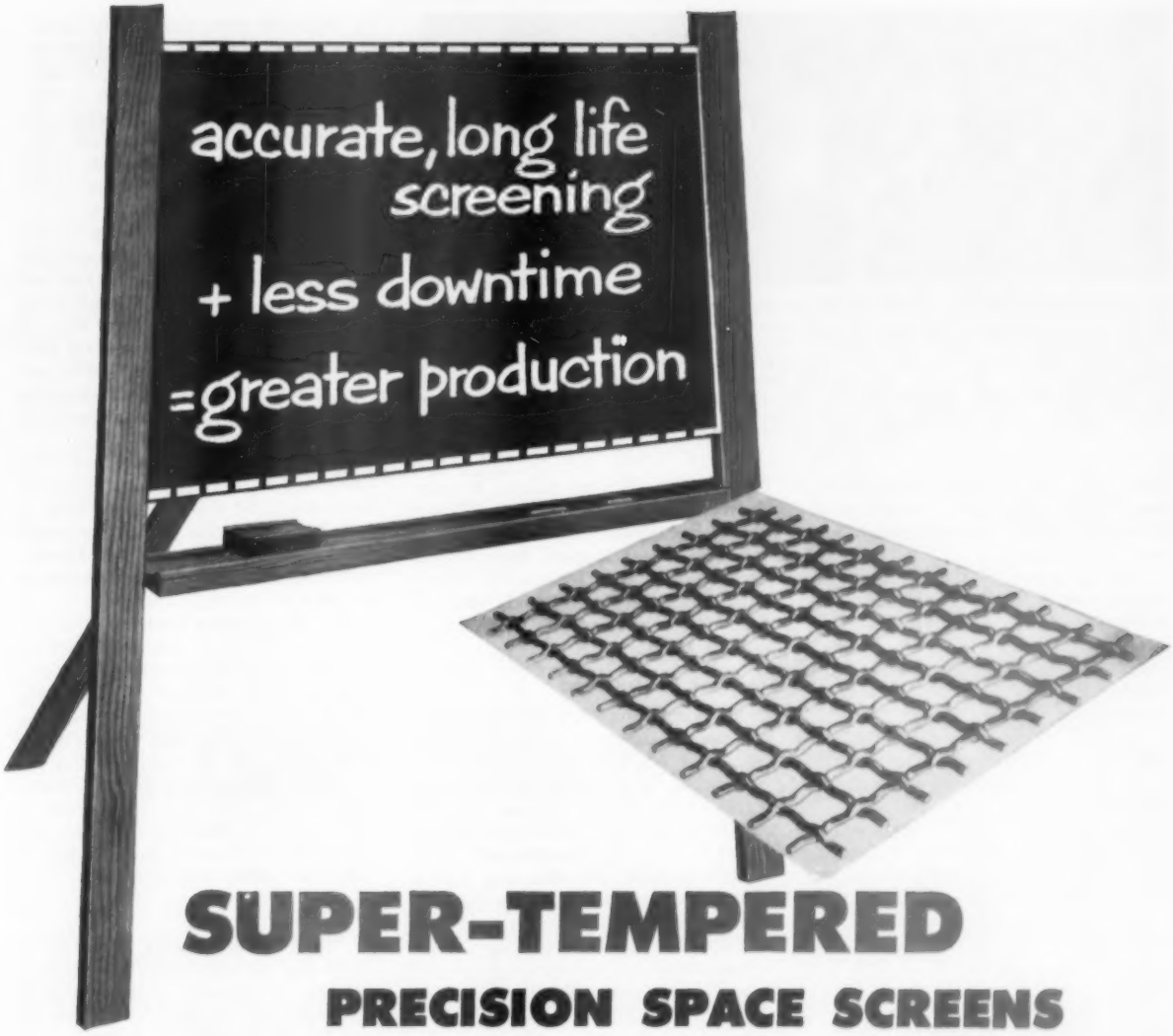
Social activities included a buffet supper with dancing, and the annual reception and banquet at which Ralph G. Brooks, nationally known speaker, gave an entertaining and humorous talk. A special program was arranged for the ladies including movies, style shows, city tours, cards and shopping trips. Russell W. Hunt was chairman of the convention committee.

Officers

Leonard S. Fry, Fry Coal and Stone Co., Mercersburg, Penn., was elected president of N.A.L.I. to succeed John H. Riddle. Russell W. Hunt, Southwest Lime Co., Neosho, Mo., was elected first vice-president; Julius E. Ott, The Wallace Stone Co., Bay Port, Mich., secretary; and J. B. Mount, Maymead Lime Co., Shouns, Tenn., treasurer. Robert M. Koch was re-elected executive secretary.

Arthur R. Alvis, William S. Black, John M. Deely, J. B. Mount and Robert M. Patton retired from the executive committee and, elected to fill their places, were William E. Hewitt, East St. Louis Stone Co., E. St. Louis, Ill.; Thomas B. Stafford, Vermarco Lime Co., Proctor, Vt.; Lynn N. Stewart, Meshberger Stone Co., Columbus,

New officers, left to right: Robt. M. Koch, executive-secretary; J. B. Mount, Maymead Lime Co., Shouns, Tenn., treasurer; Leonard S. Fry, Fry Coal & Stone Co., Mercersburg, Penn., president; and Russell W. Hunt, Southwest Lime Co., Neosho, Mo., vice-president



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This superior screen offers you peak performance with positive savings on even your most demanding jobs. To order, write or phone your requirements to our nearest sales office.

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Executive Committee of Manufacturers' Division. Left to right: D. H. Weber, King Powder Co., Inc.; H. A. Wendler, Highway Equipment Co., Jr. vice-chairman; Jos. A. Groden, International Paper Co.; Geo. S. Harvey, National Container Corp., Sr. vice-chairman; Jules E. Jenkins, Vibration Measurement Engineers, chairman; E. C. Farrar, American Cyanamid Co., retiring chairman; Chas. Mayer, Bradley Pulverizer Co.; Ralph C. Johnson, Simplicity Engineering Co., Sr. vice-chairman; and W. H. Van Buren, Quaker Rubber Corp., secretary. P. K. Alvord, E. I. du Pont de Nemours Co., Jr. vice-chairman, was not present

Ind.; William E. Stone, Piqua Quarries, Piqua, Ohio; and vice-president Russell W. Hunt who automatically is on the committee.

Newly elected to the board of directors were P. D. Archibald, The Callanan Road Improvement Co., South Bethlehem, N. Y.; W. M. Palmer, Jr., Dolomite Products, Inc., Ocala, Fla.; and Herbert C. Gray (honorary), Tulsa, Okla.

Due to a resignation, Robert M. Bridges, Consumers Co., Chicago, Ill., was named regional vice-president for Region IV.

Representing the Manufacturers' Division on the board of N.A.L.I., are E. C. Farrar, American Cyanamid Co., Latrobe, Penn.; J. E. Jenkins, Vibration Measurement Engineers, Chicago, Ill.; and R. C. Johnson, Simplicity Engineering Co., Durand, Mich.

Manufacturers' Division

Jules Jenkins, Vibration Measurement Engineers, Chicago, Ill., was elected chairman of the Manufacturers' Division of N.A.L.I. Other officers are Ralph Johnson, Simplicity Engineering Co., Durand, Mich., first vice-chairman, Sr.; George S. Harvey, National Container Corp., Boston, Mass., second vice-chairman, Sr.; P. K. Alvord, E. I. du Pont de Nemours Co., New York, N. Y., first vice-chairman, Jr.; H. A. Wendler, Highway Equipment Co., Cedar Rapids, Iowa, second vice-chairman, Jr.; and W. H. Van Buren, Quaker Rubber Corp., Philadelphia, Penn.

The board of directors includes the following manufacturers of machinery and supplies: E. C. Farrar, American Cyanamid Co., Latrobe, Penn.; Jules Jenkins; Ralph C. Johnson; George S. Harvey; P. K. Alvord; H. A. Wendler; W. H. Plank, Arkell & Smiths, Clinton, N.Y.; Joe Groden, International Paper Co., New York, N. Y.; M. E. Greiner, Hammond Bag & Paper Co., Wellsburg, W. Va.; C. W. Mayer, Bradley Pulverizer Co., Allentown, Penn.; Kenneth Lindsay, Iowa Manufacturing Co., Cedar Rapids, Iowa; Ward McLanahan, McLanahan & Stone Corp., Hollidaysburg, Penn.; and D. H. Weber, The King Powder Co., Cincinnati, Ohio.

Outlook for Agstone

Speaking before a Greeting Luncheon on the subject, "A Quick Review and Look Ahead," executive secretary Robert M. Koch reviewed the highlights of association activity and outlined the program ahead to be followed as he sees the problems and needs.

The Institute, he said, was started because of the desire of the industry for activities at the national level in the interest of agricultural limestone. Membership has grown to exceed 400 members, said Mr. Koch, and he has personally visited more than 1000 quarry operations since the association was started.

Lobbying in Washington continues

John H. Riddle, Riddle Quarries, Inc., outgoing president, and **Leonard S. Fry,** Fry Coal & Stone Co., Mercersburg, Penn., incoming president

an important function, said the speaker, because of lack of knowledge among congressmen and due to turnovers in office which require a constant job of supplying information. He stressed that emphasis is to get congressmen to vote on measures based on understanding of the subject rather than be due to pressure tactics.

The A.C.P. program calling for exexpenditure of $250 million annually will continue and, he said, for the first time without objections. The soil bank idea is favorable to many but there is a question as to whether a good program will evolve. A great deal of red tape is expected. However, a growing interest in soil improvement is being noted in Congress.

Activities at the state level are to be continued by N.A.L.I. As a result of such work, 21 states do not have a mandatory soil test requirement now whereas there were only two. Promotional activities were greatly expanded in 1955.

Mr. Koch spoke briefly on the formation of N.C.L.I. which was set up in order to supply crushed stone services for those desiring it. There will be no direct connection between the two organizations and he promised that there will be no reduction in N.A.L.I. services even though 25 percent of his time will be devoted to N.C.L.I. The plan is to eliminate much of the routine work which he had been doing with N.A.L.I.

Movies

The business session was opened with the showing of two excellent movies—one entitled "The Other Side of the Fence" by Wm. A. Albrecht for Phillips Petroleum Co. and the other "The Big Test" by J. W. Fitts, North Carolina State Dept. of Agriculture, sponsored by the National Plant Food Institute.

President's Report

In opening the business session, President John H. Riddle reviewed major accomplishments of N.A.L.I. during 1955. Among these were the following:

1. Membership increased by 83 active members and 42 associate members.

2. Executive staff attended 43 meetings held in 26 states.

3. Nine states dropped the mandatory soil test during the year, making a total of 21 without this feature.

4. Instrumental in securing appropriation of $250 million for 1956 A.C.P.

5. Made progress towards increasing national conservation effort under the A.C.P. and the soil bank.

(Continued on page 156)

Why More Hours are Working Hours With Bucyrus-Erie Walking Draglines

Close attention — during manufacture — to the little things that mean outstanding quality — that's one big reason Bucyrus-Erie walking draglines give you the most in actual productive time on your digging or stripping operations. Take the steels Bucyrus-Erie "walkers" are made of, for example. To the naked eye there is very little difference, in comparison with other machines. But a microscopic examination of vital parts would show the many important *little* differences that together make such a *big* difference in performance on the job.

At Bucyrus-Erie, hammer forging, annealing, heat treating, case hardening, and flame hardening — each process is applied where it contributes most to strength, toughness, and hardness. The most modern arc welding is used, plus stress relieving by heat treating, where this will contribute greater strength and longer life.

Long-reaching, big-capacity Bucyrus-Erie walking draglines are available in a wide range of sizes to fit your working requirements. Talk over your excavating problems with the Bucyrus-Erie sales representative in your area — he's well qualified to help you select the right machine for your particular needs.

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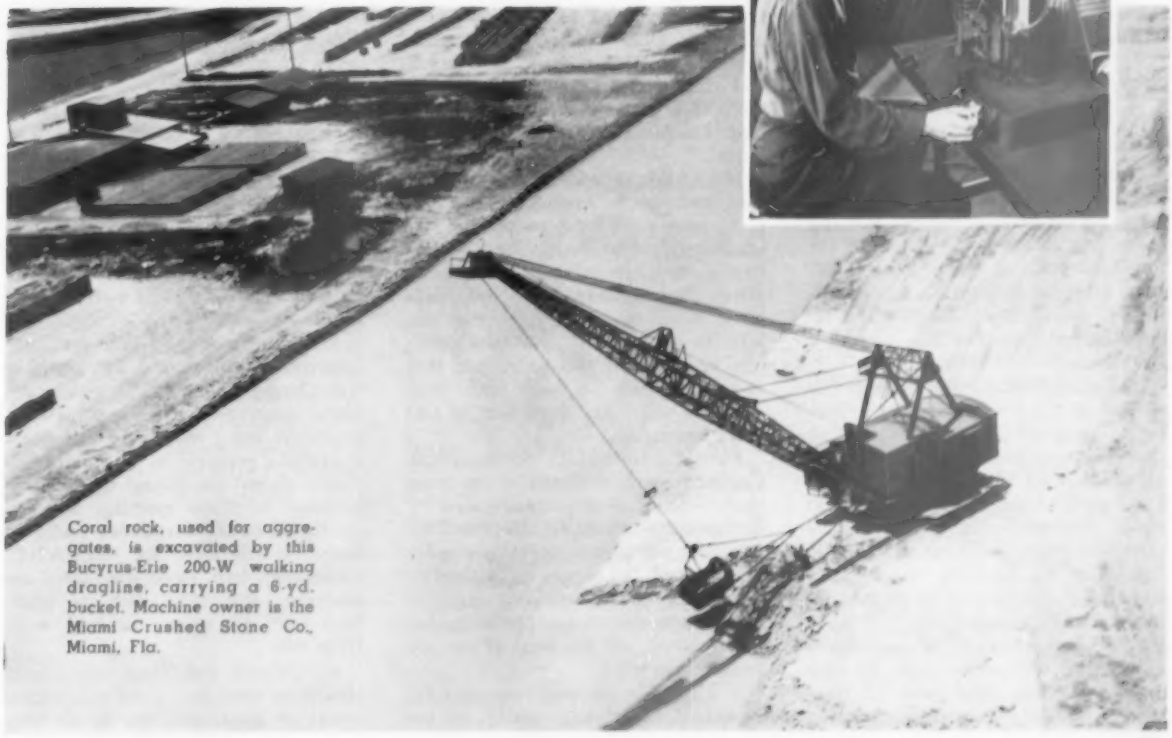
South Milwaukee, Wis.

A laboratory technician burns chips from a foundry test bar to determine carbon content of the steel. Each heat is triple tested to ensure its meeting specifications.



Coral rock, used for aggregates, is excavated by this Bucyrus-Erie 200-W walking dragline, carrying a 6-yd. bucket. Machine owner is the Miami Crushed Stone Co., Miami, Fla.

6. Made progress towards eliminating "initial concept," i.e., restriction against reliming.

7. Made progress towards increasing payment rate in some areas for aglime from 50 percent to 75 or 80 percent.

8. Association sold 340,074 circulars in 1955 compared to 223,404 in 1954. Two of these were new black and white and one was color.

9. Published 2,833 news releases in 1955 compared to 1009 in 1954.

10. Surveyed its members, and after consideration of the board and executive committee, made an arrangement with the new National Crushed Limestone Institute to service its members in the field of highway legislation.

Mr. Riddle elaborated on the last item, outlining the series of events transpiring during the year which ultimately led to the formation of N.C.L.I. He offered to take full responsibility for initiating the movement and organizing the group.

Committee Reports

J. J. Griesemer, chairman, by-laws committee, reported that the by-laws were changed to permit three Manufacturers' Division representatives to vote on the N.A.L.I. board.

Russell W. Hunt, chairman, convention arrangements, announced that the midyear directors meeting will be held at the Chase Hotel in St. Louis, Mo., on June 4-5. The next annual convention is tentatively scheduled for the Statler Hotel, Washington, D.C., during the week of the presidential inauguration.

The legislative and public relations committee report, given by Jack Deely in the absence of committee chairman, Wm. J. Clark, stated that Jules Jenkins, E. C. Farrar, and Sam Omasta were appointed to a subcommittee to investigate the current activities of the recently-formed joint working committee of the National Board of Fire Underwriters dealing with insurance subrogation of blasting claims. It was recommended that N.A.L.I. request representation on this committee (as a member of industry).

The committee further recommended that N.A.L.I. continue the important work of educational lobbying and also continue to stress the importance of maintaining the family size farm unit, particularly in its relation to A.C.P. and to the conservation acres provision under the soil bank plan.

Buford V. Everett, membership committee chairman, reported that active membership now totals 393. Since the last convention, 83 new producers have joined, 16 have resigned, 10 have gone out of business, and 22 have been dropped for non-payment of dues.

Ervin L. Peterson, assistant Secretary of Agriculture, luncheon speaker

To increase membership, Mr. Everett recommended revising the member-get-a-member campaign.

Charles Rich, percentage depletion chairman, reported no new developments in this field. The industry is still waiting for the final regulations, he said.

Wm. F. Childs III, chairman, promotion and education committee, stated that the *Sales Promoter* was discontinued after being published for six months; 239,000 copies were distributed. Circulars were sold to 107 companies, and sales approximated 340,000 pieces. News releases coverage was expanded to over 400 new outlets in Ohio and over 300 in the northeast. Printing of a new black and white leaflet promoting agstone in the cotton growing areas was authorized. Outdated folders were discontinued.

Mr. Childs urged that the news release coverage be extended to a greater number of Vo-Ag people, to soil scientists, and to county agents. His committee recommended that news releases be expanded to include state associations, that one new Fair exhibit be prepared, that no new circulars be made at this time, and that more meetings be held with state A.S.C. Committees in order to cut down red tape.

Earl P. Holwadel, vice-president, Region II, gave a report of the combined meeting of representatives of the five association regions. He listed the following complaints or reasons as being some of the causes of inadequate use of agricultural limestone, resulting in vast amounts of appropriations being returned and the need of the soil being neglected.

1. Laxity for the past two years (as compared to previous years), on the part of local county offices to promote aglime participation.

2. So-called red tape, e.g., farmers having to submit soil samples and giving recent soil history as to all types of fertilizer applied.

3. Restrictions: In some areas and for some practices, farmers have to purchase and apply various additional fertilizers in order to obtain help on aglime.

4. Inadequate testing equipment available. County extension agents, who usually supervise the testing, admit that the equipment is anything but efficient. Also, very few farmers actually know how to take a proper soil sample; some samples are taken from between corn rows, or taken right in the furrow in which fertilizer has been drilled, and some farmers try to obtain more lime by taking samples from soil they know is very poor, etc.

5. Many of the state A.S.C. committees have refused to relax their restrictions or broaden their policies in order to try to improve the program situation, even in the face of catastrophe, such as the extreme drouth experienced in some states.

Mr. Holwadel, speaking for the regional groups, made the following recommendations.

1. Either entirely eliminate the mandatory soil test requirement or relax it to allow each state or county committee to make a minimum tonnage allowance applicable to their area, such as 1, 2 or 3 tons per acre. Then the producers and organizations in those areas should do everything possible to see that such minimum allowances are made.

2. Eliminate the mandatory use of other fertilizers in order for the farmer to obtain A.S.C. aglime.

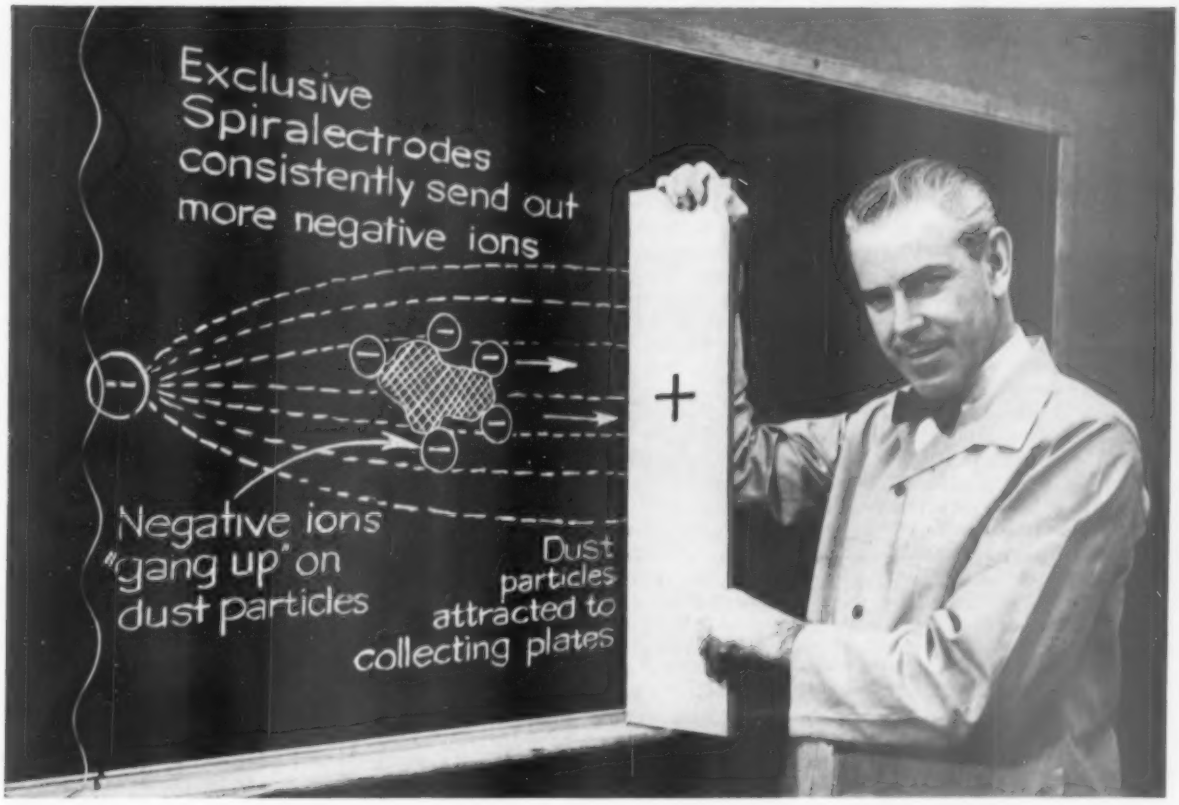
3. If possible, especially in stricken areas, raise government assistance from 50 percent to 70 or 80 percent.

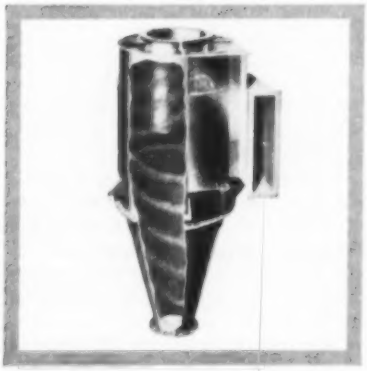
4. State and county committees should be instructed by regulation, if possible, that lists of farmer A.S.C. program signers should be furnished to all vendors.

5. Meetings of state lime producer associations with state A.S.C. committees should definitely be continued. These meetings can be improved by producers using more care and effort in advance preparation; also more emphasis should be placed on the importance of these meetings to each producer. Better attendance and participation will show the state A.S.C. committees that more producers are becoming acquainted with the problems and are willing to help work them out.

6. County and state committees should be contacted prior to the allocation of funds and also at the time

How a Buell Collection System "gangs-up" on dust to meet the toughest air pollution codes





Buell Cyclones also deliver extra collection efficiency to "gang-up" on dust: Exclusive Shave-off design harnesses double-eddy current and puts it to work.

With positive gas flow control for peak efficiency . . . plus continuous cycle rapping to eliminate puffing . . . Buell's "SF" Electric Precipitator really "gangs-up" on dust (even dust with high resistivity) to permit full production even under the most rigid anti-air-pollution codes.

Buell's Low Resistance Fly Ash Collector combines high efficiency to meet present day strictness, with low draft loss for natural or mechanical draft installations.

FOR THE COMPLETE STORY
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Dept. 17-D, 70 Pine Street
New York 5, New York

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MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

the local handbook is being prepared to see that adequate percentage of the allocation is provided for use of lime.

Finally, Mr. Holwadel pointed out, some of the blame for a decline in the use of aglime can be placed on the state associations and on individual producers. He urged more visits to the county office, greater cooperation between the producer and the aglime committee, more meetings with state committees and better attendance at the meetings, and finally more promotion and advertising.

Panel on Promotion

THE PANEL ON PROMOTION, presided over by Wm. F. Childs III, was led off with a talk relating how advertising campaigns can be effectively translated into product sales given by Clyde Rapp, Chicago advertising agency executive. Mr. Rapp expressed amazement that a product such as agricultural limestone, which gives a 700 percent return on investment, is not being sold to a greater extent. To promote sales, he suggested that the industry embark on a large scale 3- to 5-year advertising campaign; this could be considered a long term investment, he said. It was pointed out more business failures have resulted from underspending on advertising than overspending. Part of the money appropriated for the campaign should be used for a detailed research study of the farm market. He thought that prices might be raised to permit more extensive merchandising.

In discussing basic fundamentals of advertising, Mr. Rapp stated that its purpose is to develop new customers and to help old customers. It serves to separate the prospects from the suspects. Good advertising, he said, should have a central idea which is repeated constantly; it should tell the story thoroughly and interestingly, use the buyer's language, list benefits of the product, be honest and realistic, should attract attention, and should reward the reader for time spent. Advertising, he said, cannot sell an inferior product over a long period of time, cannot support a product which is over-priced, and cannot uphold untruths. He added that the copy and layout must be carefully planned.

R. B. McNab described his company's participation last year in the nine-day Mid-South Fair in Memphis, Tenn. American Limestone Co. had one of 65 exhibits in the agricultural building; the booth was rented from N.A.L.I. and featured two large billboards—"Liming Pays Three to One" and "Land Needs Lime." In addition, free N.A.L.I. and company literature was available, plus samples of the company's "special-grade" dolomitic agstone. As a good promotional gimmick, the company gave away over 5000 varnished yardsticks bearing company advertising. Mr. McNab stated that the exhibit was highly successful; he estimated that 40,000 farmers passed by the booth and that 10,000 stopped in to get the literature. He added that after the Fair was over, the company had more calls from farmers about agstone than ever before.

W. D. Fyock, agronomist, described various promotional methods employed by his company. One important feature stressed is to help the farmer do a better job of farming, regardless of whether it will mean using more fertilizers or other practices. The company offers free soil testing services by trained agronomists to determine lime, potash, and phosphorous needs. Another service offered is the custom spreading of a complete line of fertilizers, including anhydrous ammonia. Spreading is done with modern equipment, which is kept painted, clean, and in good condition. Mr. Fyock also stated that efforts are made to make salesmen indirectly out of the Vo-Ag people, equipment dealers, and members of the S.C.S. and the Farmers Home Administration. This is done by urging farmers to use all of the conservation dollars available—some for fertilizers, some for equipment, etc. In addition, the company's salesmen show enthusiasm for the product, always use the direct approach (never high pressure tactics), and never apologize.

Publication of a monthly bulletin, "The Soil Builder," which deals with agriculture (and not just agstone), and use of 15 min. farm interviews on radio, newspaper releases, and N.A.L.I. literature are also important, the speaker said.

Wm. Hewitt, with the assistance of Roy Hunter, an Illinois agricultural association official, described the soil bank plan now under consideration by Congress. It was felt that the program would stimulate sales of agstone for use on the conservation acres, that is, those acres set aside for soil building crops which are not harvested. Mr. Hewitt urged members to support the soil bank plan. He indicated that the wild life groups are backing the plan.

Wm. E. Stone discussed several new developments in Ohio which he said are paying off. The Ohio agstone association annually awards one fellowship for advanced study and two college scholarships, the latter to juniors or seniors. Last year the association embarked on a cooperative advertising program in the *Ohio Farmer*, using 24 issues during the year. The ads emphasize the correlation between use of agstone and health and profit. By buying advertising space, the association is also able to have "free" articles on agstone run frequently.

To promote the wide use of N.A.L.I. monthly newsletters, the Ohio association now sends these to every Vo-Ag instructor, county agent, and A.S.C. office in the state—making about 500 newsletters distributed monthly.

The speaker suggested that producers work more closely with their truckers and dealers, perhaps even using cooperative advertising. The Piqua company lists the names and addresses of all its truckers in its direct mail literature, which goes to about 10,000 farmers.

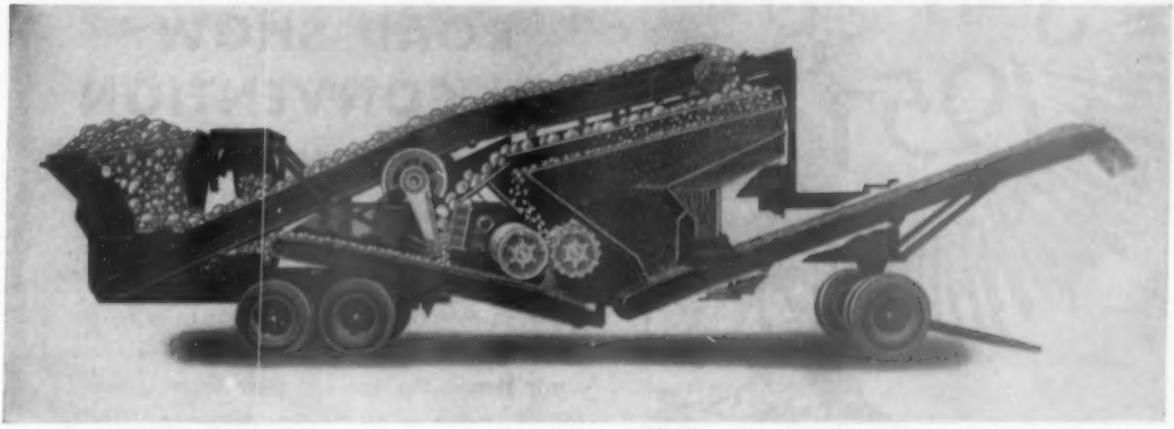
Mr. Stone also discussed getting occasional free publicity in a local newspaper which has a daily column on farming. The company works with the editor, supplying data and photos on prosperous farm operations utilizing agstone.

(Continued on page 162)

Panel on Promotion. Left to right: Wm. E. Stone, Armco Steel Corp., Piqua, Ohio; R. B. McNab, American Limestone Co. Knoxville, Tenn.; Wm. F. Childs, III, Harry T. Campbell Sons' Corp., Towson, Md.; Clyde Rapp, advertising executive, Chicago; W. Dean Fyock, Fry Coal & Stone Co., Mercersburg, Penn.; and Wm. E. Hewitt, East St. Louis Stone Co., East St. Louis, Ill.

YOU NAME THE JOB

there's a UNIVERSAL CRUSHING PLANT ready to make shorter work of it



Universal 880 Gravelmasters—complete, compact crushing, screening and loading plants. Available in a range of sizes with reported capacities of 75 to 400 tons per hour.

What kind of output capacity do you need to operate at the best margin of profit? Big capacity? All you can get? Universal jaw crushers are available in sizes up to 44" x 48"; roll crushers up to 54" x 24"; impact breakers up to 57" x 60". And you can get Universal screening, loading and washing equipment in all sizes, too, to give you the right combination for profitable operation.

Need big capacity in a portable plant?

The Universal 880 Super Senior Gravelmaster comes with 40" x 24" rolls; 10" x 36" jaws . . . with plenty of screening and conveyor capacity to take care of the huge crusher output.

Is this more capacity than you need?

Perhaps the Universal 880 Junior "B" fits your requirements best. The 880 Gravelmasters come in a wide range of sizes. Any one of them can be used as a complete gravel crushing, screening and loading plant. Or, as a "secondary" in combination with Universal 546P primary units ranging in jaw size from 15" x 24" to 30" x 42".

Tell us your job requirements—write to the address below or consult your distributor. You'll get a carefully considered recommendation fitted to your needs.

MODEL	Junior "B"	Junior	Senior "B"	Super Senior
Jaw Crusher	10"x16"	10"x24" 10"x36"	10"x36"	10"x36"
Roll Crusher	18"x16"	24½"x16"	30"x26"	40"x24"
Gyrating Screen	2'x8' 2½	3'x10' 2½	4'x12' 2½	5'x12' 2½
Plate Feeder	19"	19"	25"	25"
Weight	28,600#	44,500#	54,000#	59,600#
CONVEYORS				
Under Conveyor	18"x10'	24"x14'	30"x18'	30"x19'
Feed Conveyor	20"x23'	24"x26'	30"x29'	36"x34'
Delivery Conveyor	24"x18'	24"x20'	30"x21'	30"x24'
	Front Discharge Folding	Front Discharge Folding	Front Discharge Folding	Front Discharge Folding

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A.R.B.A.
ROAD SHOW and CONVENTION
PLAN NOW!

1957 will bring with it the first Road Show in almost 10 years! Tremendous advancements have been made in this last decade. New equipment has been developed. New methods have superseded old. New cost-cutting ideas have come forward. Here is the time and place to bring yourself up to date on all the new developments.

Nothing is being spared to make this 1957 Road Show the greatest indoor exhibit of machinery and materials ever gathered together. At the same time, the A.R.B.A. convention will give you an opportunity to learn about new methods and practices and hear outstanding authorities discuss the solution of problems that are bothering you.

Put it down as the most important date for the construction industry in 1957. Write for data on reservations. Ask to be put on the list to receive future information on the 1957 A.R.B.A. Road Show and Convention.

AMERICAN ROAD BUILDERS' ASSOCIATION
World Center Building
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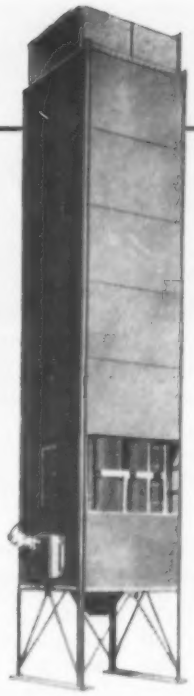
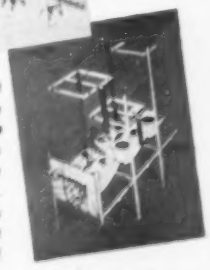
The latest advancement in dust recovery

Dualaire*

REVERSE-JET DUST COLLECTOR!



- *Cleans without jarring or rapping!*
- *Maintains uniformly low pressure drop!*
- *Field-proven efficiency as high as 99.99%!*



Backed by the same organization that pioneered commercial application of COTTRELL Precipitators and MULTICLONE Collectors, the DUALAIRE Reverse-Jet Dust Collector is revolutionizing filter-type recovery systems. The DUALAIRE gives you vital advantages like these . . .

REVERSE-JET CLEANING ACTION cleans the filter tube continuously in small increments—not with sudden surges as in rapping or jarring.

CLEANING ACTION starts automatically and stops automatically to keep pressure differential within low pre-set range.

FILTER EFFICIENCY remains uniformly high at all times because no thick filter cake ever forms to reduce operation effectiveness. Actual field tests show efficiencies as high as 99.99%!

NO STANDBY UNITS, with their complicated switching devices, are needed. The DUALAIRE is cleaned as it filters—without interruptions or shut down periods for cleaning. The operation is continuous!

FILTER UNITS LAST LONGER because they are not subjected to intermittent jarring, rapping or vibration—all destructive to filter fabrics.

The above are only a few of the many important advantages you get in DUALAIRE Dust Collectors. This 12 page booklet gives the full story . . . explains how reverse-jet cleaning action works — shows how the basic DUALAIRE unit is adaptable to a wide range of operating requirements — provides facts, figures and illustrations that will change your thinking on filter-type recovery systems. Send for your free copy of this descriptive booklet — or see your nearest Western Precipitation representative!

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Panel on A.C.P. program. Left to right: Paul M. Koger, Administrator, A.C.P.; Lester E. Leigh, Midwest area director, Commodity Stabilization Service; Robt. M. Koch, moderator, N.A.L.I. executive secretary; Harris W. Soule, Northeast area director, C.S.S.; Joe Clifton, Southwest area representative, C.S.S.

Panel On A.C.P.

ROBERT M. KOCH was presiding chairman for the panel discussion on the Agricultural Conservation Program. Panel participants were five top officials of the U.S.D.A., being the Commodity Stabilization Service Area Directors who are the liaison between the Department and the State Agricultural Stabilization Conservation committees.

Lester E. Leigh (Midwest area), Harris W. Soule (Northeast area), Joseph Clifton (Southwest area) and Paul M. Koger (formerly Southeast area), administrator of A.C.P. comprised the panel. Each spoke briefly and then proceeded to answer questions as to policies and procedures in the respective areas related to soil conservation.

Mr. Koch started the program by citing the ups and downs in tonnage of agstone over the years. Before 1935 when the federal program started, the annual national tonnage never exceeded three million tons and averaged less than half of that. After 1935, the tonnage increased to a peak of 30 million tons in one year but recently has dropped. The tonnage was likely less than 18 million in 1954. In Mr. Koch's opinion, the tonnage is now on the increase.

Paul Koger commended the association for a fine job in promoting use of a basic commodity and he said his office is working on ways to improve the A.C.P. program. He invited suggestions. He said that farmers used more agstone in 1955 than in 1954, but that the tonnage is less than one-fourth the national need. Since 1949, he said, liming materials purchased without federal support had increased very little.

His figures were that use was 17.3 million tons in 1954 valued at $69.7 million and involving 10.5 million acres of land. About 12.5 million tons involved expenditure of $26 million in federal funds. A.C.P. is involved in the cases of 72 percent of the farmers using liming materials and paid 37 percent of the total cost.

He said that the proposed soil bank will increase the use of liming materials since acres set aside from production will be eligible for conservation work.

Mr. Leigh said that a great deal of teamwork involving the U.S.D.A., the state committees, the farmer and producers will be required to get the job of conservation done. During 1950-1953, 16 percent of total A.C.P. payments were for agricultural limestone, and the figure increased to 21 percent in 1954. He believes there is a lot more opportunity to increase volume of sales. Sixty-two percent of soil samples taken in Mr. Leigh's own country, he said, indicated the need for liming after 35 years of application.

Mr. Soule said that assistance from producers in the administration of A.C.P. was the desire. Fifty percent of commercial farmers in the northeastern area are participating in the program and 70 percent of the funds are for the use of minerals including liming materials. The percentage figure was higher a few years ago but there has been a shift in emphasis on conservation practices. Mr. Soule recognizes that available funds and red tape have slowed the program, and he said there was a need for working toward more uniform specifications and for more educational work among farmers.

Joseph Clifton (Southwest) said that liming in his area was confined largely to the eastern part of his area with some use in California. Needs have not yet been calculated for the other five states. He recognized that the industry has been cooperative when the A.C.P. has been threatened, but believes more cooperation is needed.

A producer from eastern New York State said that only 300 of 900 farmers over a county signed up and that only 200 received assistance. Others dropped out because there was no follow-through on soil testing. He said that a change in this requirement was needed.

Mr. Soule, in reply, said that the administration of the soil test is a state committee requirement and that many factors including funds, weather and soil test were responsible for the drop off in participation. He stressed the need for more personal calls on farmers, and he admitted that some unused funds are being turned back.

A midwestern producer said that delays are resulting because the county office managers are slow in signing purchase orders. It was brought out by one of the equipment manufacturers that otherwise unused funds may be utilized if producers stress winter application of agstone, which can be done when other conservation practices cannot be undertaken. He also said that prices must be increased so that advertising and other selling costs are justified.

A midwestern producer who visits every farm house in his area each year asked if he, as a producer, could sign up the farmer for the A.C.P. program. The answer to that question was not forthcoming without checking.

In answer to another question on soil tests, Mr. Leigh said that the purpose of the test is a guide to correct application of limestone whatever the results of the tests. Producers complained about the inadequate testing facilities and the fact that test results are so inconsistent between different laboratories.

Mr. Koch believes that the soil test has educational value but should not be a mandatory regulation. He expressed the opinion that the farmer be permitted to apply liming if he gets good results from the practice and wants to do it, since he cannot overlime anyhow.

In answer to a producer's question as to why a farmer must tell what fertilizers were applied before he may be permitted to apply liming materials, it was brought out that variations in fineness in their effects on speed of reaction are a factor. If a material requires three years to become effective, there would be no reason to recommend further application in the current year.

Mr. Koch said that changes in rules

(Continued on page 202)

Dart 140-TC truck with Allis-Chalmers 8DAS-1125 supercharged diesel being loaded by a shovel powered by an Allis-Chalmers 6DCS-1879 supercharged diesel.

Fifty-five ton Dart truck powered by Allis-Chalmers 8DAS-1125 supercharged diesel dumping over edge of spoil bank that is approximately 500 ft high.

DIESEL ENGINES AVERAGE 5,000 HOURS BEFORE OVERHAULS

Allis-Chalmers Buda Division truck engines powering 24 Dart and Euclid trucks help keep production flowing smoothly at the Bagdad Copper Corp. mine under extremely demanding conditions. These trucks work two shifts a day, six days a week, hauling out both overburden and ore. The haul covers about 7/10 mile, up a grade which starts at 12 percent and quickly increases to 18 percent, with five torturous switchback turns. Thick, abrasive dust adds still further to the grueling test.

Under these conditions the Allis-Chalmers engines have averaged over 5,000 hours of operation before their first overhaul. Many of them have given more than 20,000 hours of service since 1949, and are still "going strong."

Other Allis-Chalmers engines also take a hand in production even before the hauling stage. A large shovel powered by a Model 6DCS-1879 engine has loaded out more than seven million tons of ore since June, 1949. There are Allis-Chalmers engines on the drills, compressors and dozers.

Altogether, the performance of these big, tough engines has helped hold the over-all cost of moving ore and overburden to less than ten cents a ton. It will pay you to put productive performance like this under the hood of your trucks and other units. Write for complete details and the name of your nearest Buda Division dealer.

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BC-1

Trucks at the Bagdad Copper Corp. mine, Bagdad, Arizona, haul overburden and ore up grades as steep as 18 percent and around five torturous switchbacks — a real test for any hauling unit and its engine.

Forum On Operating Practices

RUSSELL HUNT, acting as temporary chairman, introduced the first speaker, K. E. Joy, Corps of Engineers, U. S. Army, Ordinance Department, who was not scheduled on the formal program. Mr. Joy briefly outlined the government's program of storing machine tools and other essential materials for emergency use. In all, some $4½-billion dollars worth of material are either now in storage or eventually will be under the program. Where possible, the items are stored close to the place where they may eventually be used but the highlight of the talk was the Atchison, Kan., underground storage facilities. The Atchison mine was an old limestone operation, comprising flat-bedded stone with suitable tunnel openings in the bluff where the limestone outcropped. Prior to use by the army as a storage depot, the Atchison mine had been used for storage of surplus food and at that time was equipped with the world's largest refrigerator plant. The mine has 500,000 sq. ft. of storage area that is being enlarged by connecting up rooms that were a part of the original limestone operation with the storage area increased to 1,300,000 sq. ft.

When the mine was taken over for storage of emergency needs, the ice plant was changed over to a de-humidifying system as a low humidity is necessary to help keep metal items from rusting. The cost was given at $2.50 per sq. ft. and this included paving (black top) floors and other necessary additions. The floor height is 13 ft. The de-humidifiers consist essentially of silica gel beds through which the damp air is pumped. The silica gel absorbs the water. When the gel has become saturated and will not absorb more moisture, heating coils raise the temperature of the gel, the water is cooked out, and the gel then becomes reusable. This type of de-humidifier, the speaker said, was a relatively cheap installation.

Drilling and Blasting

The operating panel session chairman was C. A. Broecker, Newton County Stone Co., Inc., Kentland, Ind. Panel members were: Charles Rich, Swanton Lime Works, Swanton, Vt.; Thomas B. Stafford, Vermarco Lime Co., Proctor, Vt.; and B. V. Everett, Everett Quarries, Inc., Plattsburg, Mo. After the manufacturer's representatives were introduced to the operators, the subject of drilling and blasting was introduced, and the term "Blasting Agent" explained by E. C. Farrar, American Cyanamid Co., who classed the material as an ammonia explosive that found its first use in coal stripping, from which the practice spread to the larger quarries. The blasting agent is not a high explosive and is not cap-sensitive, and contains no nitro-glycerine. It is easy to ship, relatively low in cost per pound of explosive, and the 4-in. dia. sticks are the smallest normally manufactured. To detonate the blasting agent, it was explained that up to 20 percent dynamite must be used as a detonator. The blasting agent has a NG equivalent of 64. Its speed is a controversial subject but most contend it is 5000 to 6000 f.p.s. while others quote as high as 15,000 f.p.s. The largest cartridges made by American Cyanamid, the speaker said, was 11 in. in dia. and no matter what diameter purchased, the material is only sold in carload lots. Later, a cartridge smaller than 4 in. might be supplied but so far the detonating wave had a tendency to die out with the smaller cartridges. Prices in carload lots (base price) was given as follows:

Diameter	Cost
Plus 7-in.	$10.50 per cwt.
6—7-in.	11.00 per cwt.
6—4-in.	11.50 per cwt.
High explosives as a comparison were quoted as	15.95 per cwt.

D. H. Weber of the King Powder Co. said some used 50 percent high explosives and 50 percent blasting agent, and it developed that the material will not stand water but this could be overcome by supplying a waterproof package. There is no deterioration in storage and the fire hazard no worse than for other types of explosives. It was assumed that lightning might detonate the blasting agent.

The discussion also brought out that loose ammonium nitrate has not been used in quarries, but has been used in coal stripping. In the loose form it lacks compaction, water affects it, and it is not an efficient explosive under most conditions.

With reference to the hazards of storing dynamite, one experience was recounted where the quarry operator had no explosive storage facilities and normally used all the explosives he ordered. However, through some oversight, one stick was left; boys got the explosives and one of the youngsters was killed. A lawsuit resulted and the manufacturer of the explosive and the quarry operator had to pay equal damages. So now this manufacturer of explosives won't sell to a quarry unless adequate storage facilities are available.

Thomas B. Stafford led the discussion on drilling, and much of the talk related to the use of sectional steel. It developed that sectional steel was easier to handle and lighter in weight than conventional longer steels. The steel is available in 6, 8, 10, and 12-ft. sections; Joy and Gardner - Denver steels were both mentioned in the discussions. Holes 90 ft. deep were the deepest mentioned, and this operator drilled 105 holes, using a 600 c.f.m. Gardner - Denver rotary compressor. There was no drill breakage in this operation.

Heated Screens

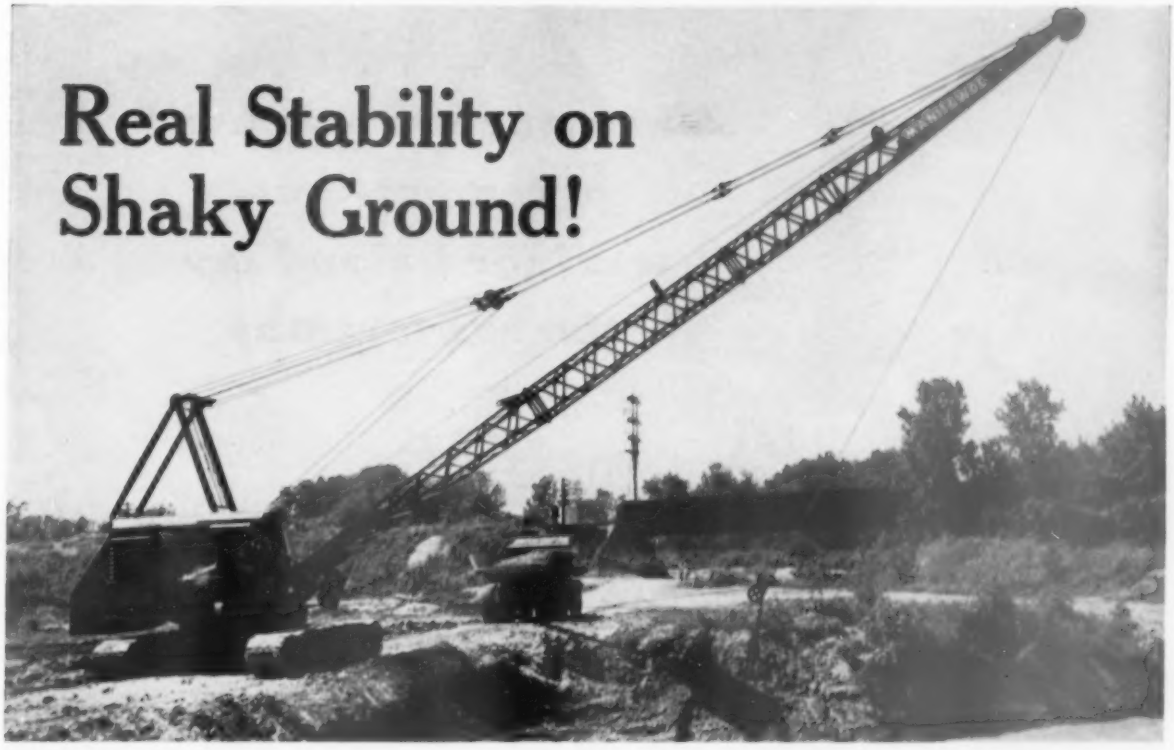
Charles Rich led the panel on the discussion of heated screens. It appeared to be the consensus of opinion that if the stone actually bled water, heated screens would not screen too well, but if the material was damp, a heated screen was often the answer. Wayne King of W. S. Tyler Co. said that there were at least 1000 screens screening as fine as 200 mesh, but the commodities screened under these conditions were high priced items (chemical). R. C. Johnson, Simplicity Engineering Co. approved the use of heated screens for ⅛-in. material, and it was indicated that if minus 20-mesh material was required, and the agstone bled, drying might be necessary.

Buford Everett led the panel on use of large trucking units but little discussion came from the floor. One operator said he used a 10-ton Dart truck which was a very satisfactory unit. R. C. Johnson, Simplicity Engineering Co., told briefly of the use of belt conveyors in the iron range that in many instances replaced trucks. W. H. Van Buren, Quaker Rubber Corp., discussed briefly the relative merits of the different kinds of belts now available.

On the subject of paper bags, a representative of the St. Regis Paper Co. said a side strip of paper at the gussett was working out satisfactorily in many instances and cost about half what an extra ply would cost. One operator in New England expressed the view that more bags should be used by the industry as it permits more winter operation.

The subject of crushing took up the closing session, and Paul Frank, Paul Frank, Inc., N. Vernon, Ind., outlined the use of roll crushers in his limestone operations. Roll crushers are used throughout, and he said no grooving trouble had been experienced with manganese steel shells. Gravel, he maintained, will cause grooving but limestone won't. Mr. Frank said no bearing troubles had developed with rolls, but counter shaft bearings had given trouble.

Real Stability on Shaky Ground!



Manitowoc Lower Works Design Provides Greater Stability on Treacherous River Bank

Arrow Sand and Gravel Company of Columbus, Ohio has the ticklish job of taking stone from an open pit near the Scioto River while working from the unsteady river bank. The job site is located directly across the river from the Columbus water filtration plant.

Because of the difficult footing, Arrow chose a Manitowoc dragline having the positive stability needed for full boom reach without imposing undue pressure upon the river bank during bucket return. Equipped with a 4-yd. bucket and an 80′ boom working at an 85′ radius, their Manitowoc 3900 dragline completely fills two 15-yd. trucks with stone in just five passes each.

Due to the Manitowoc's remarkable stability, the hook rollers never even touch the top flange of the ring gear during dragging and loading operations. These adjustable hook rollers at the rear almost double the effective diameter of the roller path by reducing roller loads. Machine stability is assured no matter what front end equipment might be used.

Other features contributing to the Manitowoc 3900's greater stability: 20′4″ long crawlers — spread wide — provide low ground pressure; a simple, alloy steel carbody totally enclosing travel shaft clutches and gears; and an extremely simple drive with dependable jaw type steering.

Clean, efficient design throughout means greater speed — more cycles per working day. The Manitowoc has only 14 gears and only working gears turn. This direct power flow gives top line pull and speed with fewer parts. Smooth, disc-type swing and travel clutches and air controls make the job easier for any operator — assure precise bucket control.

TORQUE CONVERTER makes uneven load handling a thing of the past. Smooth, steady power causes bucket to dig and settle on the return for a full capacity load. All hoisting operations are by accelerator control only, resulting in uniform performance. Oil cushion absorbs all shocks.

Put a Manitowoc to work in *your* quarry or pit. Smart operators settle for nothing less in peak performance, smooth operation and long working life. Full details and specifications from your Manitowoc distributor. MANITOWOC ENGINEERING CORP., MANITOWOC, WIS.

MANITOWOC

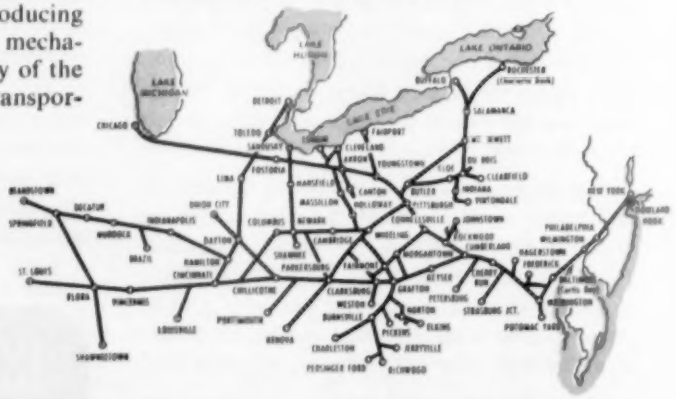
SHOVELS 1-5 YD. Speedcrane CRANES 20-100 TON

● Converting the raw building products provided by Nature into the rugged and beautiful works of man requires both vision and skill. It also requires *fuel*—the unseen factor behind every towering structure. Selecting the *right* fuel is important.

Along the Baltimore & Ohio are vast deposits of bituminous coal with structure and volatility ideal for producing cement, lime, and brick. Modern mechanization and the easy accessibility of the mines keeps production and transportation costs low. And because coal can be stored anywhere, the need for expensive facilities is eliminated.

We will be glad to advise you on the right kind of coal for your specific need, show you where to find it, and how to burn it. The modern efficiency, economy, and cleanliness of Bituminous will amaze you. *Ask our man!*

BITUMINOUS COALS FOR EVERY PURPOSE



BALTIMORE & OHIO RAILROAD

Constantly *doing things* **—better!**

Low cost-per-pound steel liners?

Here's what happened when ordinary steel liners were operated in the same mill with ABK Metal liners. You can easily see the difference in wear in this photograph.

Low cost-per-ton* ABK Metal liners?

***Low cost per ton of material ground, of course. The slight additional first cost of ABK Metal is more than offset by its extra life, by reduced labor, by savings in equipment down-time.**

ABK® METAL cuts cost 3 ways

1. ***Lasts longer*** . . . costs less per ton of material processed.
2. ***Slashes labor expense*** . . . of frequent liner replacement.
3. ***Prevents down-time*** . . . avoids costly losses in production.

Yes, three to four times normal life can be expected when ABK Metal replaces ordinary liners. That's because of its extreme hardness (500 to 700 Brinell) and very high resistance to abrasion. A controlled structure nickel-chrome iron, ABK Metal is produced only by American Brake Shoe.

A-973

AMERICAN Brake Shoe COMPANY

BRAKE SHOE & CASTINGS DIVISION
230 PARK AVENUE • NEW YORK 17, N. Y.

First officers of National Crushed Limestone Institute. Left to right: executive vice-president, Robert M. Koch, Washington, D. C.; secretary, Thos. B. Stafford, Vermont Marble Co., Proctor, Vt.; president, Joseph J. Griesemer, Griesemer Quarry, Springfield, Mo.; first vice-president, C. A. Broecker, Newton County Stone Co., Inc., Kentland, Ind. Treasurer, Taisto Laine, superintendent, Limestone plant, Hanna Coal Co., Adena, Ohio, was absent when photograph was taken

New Limestone Association

OBJECTIVES OF THE NEW ASSOCIATION were outlined and officers elected at the first annual meeting of National Crushed Limestone Institute, Inc., held February 16, 1956, at the Sheraton-Blackstone Hotel, Chicago, Ill. There were some 55 present for this session.

N.C.L.I. was formally incorporated on November 28, 1955, at Kansas City, Mo., and resulted from a desire of N.A.L.I. members to have certain services made available to them in the crushed stone field. Details leading up to its formation were reviewed, the principal objective being to inaugurate activities in the lobbying fields as they apply to crushed limestone.

An arrangement was concluded with N.A.L.I. whereby N.C.L.I. would contribute into the treasury of N.A.L.I. funds for the services of executive secretary Robert M. Koch of N.A.L.I., and staff and services until the first annual meeting.

N.A.L.I. officers acted in behalf of N.C.L.I. during the interim and appointed the necessary committees on nominations for officers, budget and by-laws.

Application blanks had been sent to all crushed limestone producers with the result that 162 had applied for membership since November 28, 1955. The association's immediate objective is lobbying in connection with federal highway legislation, to be followed with other lobbying, yet to be determined, at the Washington level on matters concerning crushed limestone producers. It is anticipated that many problems will arise related to highways such as taxes, specifications, etc., which will require effort and it was pointed out that funds for highways, once an accelerated highway program is enacted, will come up for re-consideration as to proportionment at regular intervals.

Mr. Koch will devote 75 percent of his effort to N.A.L.I. activities and the balance to N.C.L.I., with the latter making monthly payments into the N.A.L.I. treasury for use of staff and services. These funds are to enable handling the routine phases of Mr. Koch's activities with N.A.L.I, the stated objective being that with such arrangement N.A.L.I. activities for its members will not diminish. The scale of dues for N.C.L.I. is identical to that for N.A.L.I.

N.C.L.I. will function independently of N.A.L.I. Its board of directors will meet June 6, 1956, immediately following that of N.A.L.I., which is June 4 and 5 at Hotel Chase, St. Louis, Mo. Its second annual meeting will follow the convention of N.A.L.I., January 22-23, 1957, at Hotel Statler, Washington, D. C.

Officers and Directors

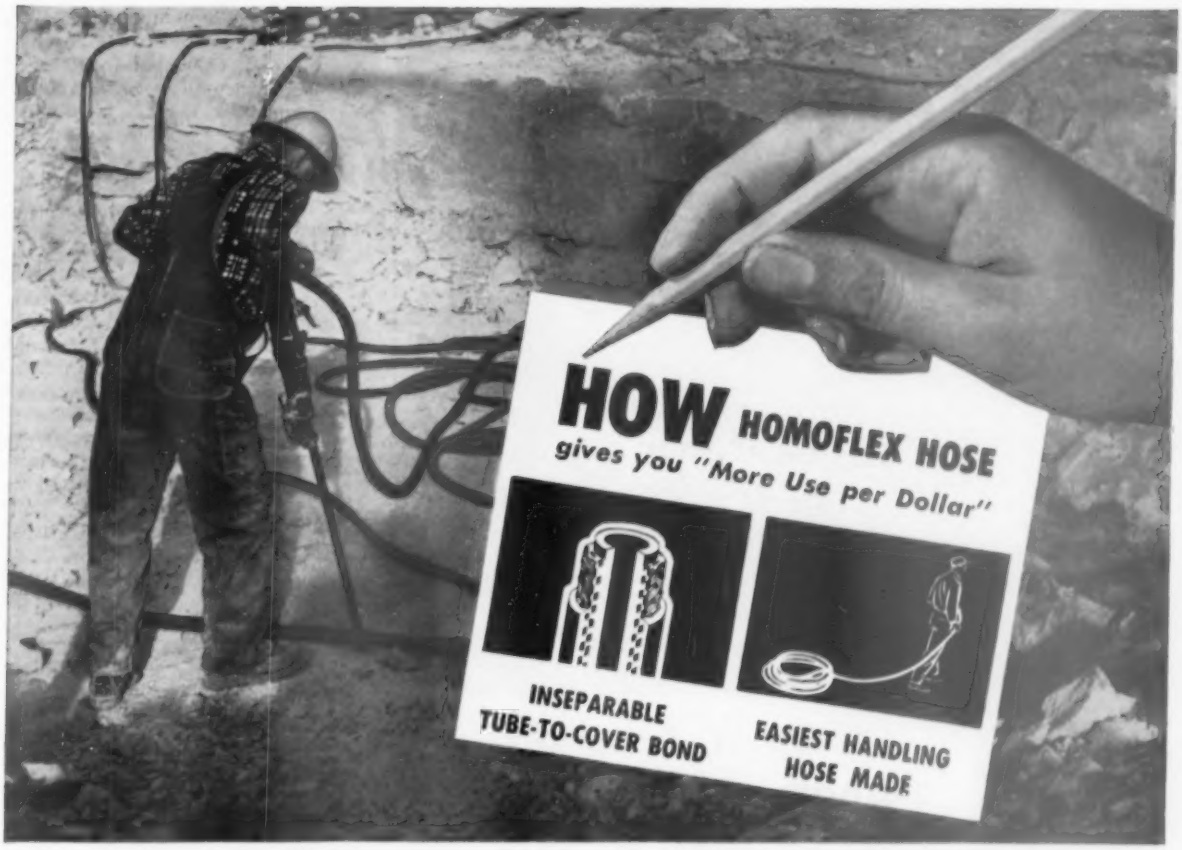
Joseph J. Griesemer, Joseph J. Griesemer Limestone Products, Springfield, Mo., is the first president of N.C.L.I. C. A. Broecker, Newton County Stone Co., Kentland, Ind., is first vice-president; Robert M. Koch, executive vice-president; Taisto Laine, Limestone Plant, Hanna Coal Co., Adena, Ohio, treasurer; and Thomas B. Stafford, Vermarco Lime Co., Proctor, Vt., secretary.

The executive committee comprises the following: Jos. J. Griesemer, chairman; C. A. Broecker; W. L. Bryan, Bryan Rock Products, Shakopee, Minn.; Buford V. Everett, Everett Quarries, Inc., Plattsburg, Mo.; L. R. Falk, L. R. Falk Construction Co., St. Ansgar, Iowa; W. O. Faylor, Faylor Lime & Stone Co., Winfield, Penn.; Paul Frank, Paul Frank, Inc., North Vernon, Ind.; J. B. Mount, Maymead Lime Co., Shouns, Tenn.; Robert M. Patton, New York Coal Co., Columbus, Ohio; John H. Riddle, Riddle Quarries, Inc., Salina, Kan.; E. B. Snead, Texas Crushed Stone Co., Inc., Austin, Texas.

Thomas E. Lalley, Bradford Hills Quarry, Inc., E. Petersburg, Penn.; Arthur Overgaard, Arthur Overgaard Co., Elroy, Wis.; J. F. Pace, J. F. Pace Construction Co., Glasgow, Ky.; Earl Thomas, T & O Lime & Rock Co., Sedalia, Mo.; and Paul E. Thompson, Servtex Materials Co., New Braunfels, Texas, are regional vice-presidents.

The board of directors is as follows: M. R. Ackland, Stoneridge Limestone Co., Rochelle, Ill.; J. B. Allen, The Allen Co., Inc., Winchester, Ky.; Arthur R. Alvis, Alvis Limestone & Concrete Products, Butler, Mo.; Alvin R. Armbrust, Fayette Limestone Co., Inc., Washington C. H., Ohio; Glenn W. Bowen, Hy-Rock Products Co., Marengo, Ind.; C. A. Broecker, Newton County Stone Co., Inc., Kentland, Ind.; Arly H. Brooks, Brooks Quarry, Kahoka, Mo.; W. L. Bryan, Bryan Rock Products, Shakopee, Minn.; Marshall E. Carr, Carr Rock Products Co., Neodesha, Kan.; G. W. Croope, F. G. Cheney Limestone Co., Inc. Bellevue, Mich.; C. Gail DeBolt, DeBolt Concrete Co., Richmond, Ind.; W. D. Dillon, Dillon Stone Co., Columbus Junction, Iowa; A. F. Dunkin, Muncie Stone & Lime Co., Muncie, Ind.; Bufford V. Everett, Everett Quarries, Inc., Plattsburg, Mo.; L. R. Falk, L. R. Falk Construction Co., St. Ansgar, Iowa; W. O. Faylor, Faylor Lime & Stone Co., Winfield, Penn.; Paul Frank, Paul Frank, Inc., N. Vernon, Ind.; Leonard S. Fry, Fry Coal and Stone Co., Mercersburg, Penn.; Merrill M. Green, M. M. Green Quarries, Carrollton, Mo.; Jos. J. Griesemer, Griesemer Quarry, Springfield, Mo.; Keith Hall, Hall and Riley Quarries and Construction Co., Boonville, Mo.; Raymond Hopper, Hopper Bros. Quarries, Pawnee City, Nebr.; Merritt L. Hulett, Vermont Assoc. Lime Ind., Inc., Schuylerville, N. Y.; F. E. Kissinger, Monmouth Stone Co., Monmouth, Ill.; Taisto Laine, Hanna Coal Co., Adena, Ohio; James W. Long, Long Rock Co., Princeville, Ill.; D. L. McCullough, Alabama Aggregate Co., Inc., Birmingham, Ala.; E. M. Markwell, Auxvasse Stone & Gravel Co., St. Louis, Mo.; Roy E. Mayes, Car-

(Continued on page 170)



This Easiest Handling Hose Gets More Work Done–Cuts Labor Costs

Bulk and stiffness have been engineered *out* of this modern hose. The unique construction of Homoflex Hose makes it light, flexible as a rope, yet strong. Made with no pre-set twist, it coils and uncoils *without* kinking. Exclusive R/M engineering creates a homogeneous cover, strength member and tube that are virtually inseparable . . . This hose is easier to handle, yet strong and safe for the toughest jobs!

Homoflex Hose is easier to couple, too, because it has uniform inside and outside diameters. All these features mean that Homoflex Hose lasts longer, gets more work done, handling air, water, other fluids and gases. Ask the R/M representative to show you how Homoflex Hose and other types of R/M hose for general and special purpose use do a better job, longer . . . give you "More Use per Dollar."

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

Norblo

AUTOMATIC

Bag Type Dust Collection

...Rugged, Efficient, Economical...

Pays for itself Quickly

For continuous and heavy duty service at constant capacity and efficiency, Norblo Automatic Bag Type Dust and Fume collection pays its own way—in the recovery of valuable materials or the removal of injurious or "nuisance" industrial air contaminants. Norblo builds the entire installation, from blowers to bag-cleaning mechanisms. Complete systems are engineered to meet specific situations, production layouts and required capacities. Norblo engineering insures low maintenance and no shut-downs—guarantees performance of every installation. Write for Bulletin 164-5.

Norblo also builds centrifugal and hydraulic dust collectors, exhaust fans, cement air cooling systems and portable dust collectors.

Cutaway shows Norblo basic unit of 78 bags. Automatic shaking and bag cleaning, one unit at a time, insures full use of cloth area better than 99% of the time.

The Northern Blower Company

Engineered Dust Collection Systems for All Industries

6408 Barberton Ave. **Cleveland 2, Ohio**

thage Marble Corp., Carthage, Mo.; Roger E. Meshberger, Meshberger Stone Co., Inc., Columbus, Ind.; Floyd H. Millen, Valley Limestone & Gravel, Inc., Farmington, Iowa; J. B. Mount, Maymead Lime Co., Shouns, Tenn.; Arnold W. Mulzer, Mulzer Brothers, Tell City, Ind.; George B. Nienaber, Nienaber Contracting Co., St. Paul, Minn.; Mrs. S. D. Pace, Monroe-Cumberland Crushed Stone, Burkesville, Ky.; John F. Patterson, Patterson Quarries, St. Charles, Minn.; Robert M. Patton, New York Coal Co., Columbus, Ohio; C. H. Peters, Fremont, Wis.; Melvin E. Raid, Raid Brothers Construction Co., Denmark, Iowa; A. E. Richardson, Gordon Bros. Quarries, Inc., Forest City, Mo.; John H. Riddle, Riddle Quarries, Inc., Salina, Kan.; Barney T. Scharbach, Sand & Stone, Inc., Essexville, Mich.; Paul W. Seitz, May Sand & Gravel Corp., Fort Wayne, Ind.; T. W. Shaw, Central Limestone Co., Morris, Ill.; E. B. Snead, Texas Crushed Stone Co., Inc., Austin, Texas; Thomas B. Stafford, Vermont Marble Co., Proctor, Vt.; John D. Teeter, John S. Teeter & Sons, Inc., Gettysburg, Penn.; Paul E. White, Valley Quarries, Inc., Chambersburg, Penn.; Gordon C. Willis, Rockydale Quarries Corp., Roanoke, Va.; H. C. Wolfe, Wyandot Dolomite, Inc., Carey, Ohio.

INSULATING FIREBRICK

(Continued from page 92)

to close up the circle. If the pressure is exerted by means of a hammer, the hammering should not be directly against the brick but should be against a piece of soft wood. Fig. 18 shows four views of a brick mason in the act of measuring, cutting, rubbing and driving a key brick.

And if much traffic is to pass over completed sections of exposed insulating firebrick lining, reasonable precautions should be taken to protect the brick from damage. Fig. 19 shows a lining protected by means of collapsed brick cartons and a rubber-tired wheelbarrow.

Fig. 20 is a view of a portion of nearly completed exposed insulating firebrick lining 217 ft. long in a 12-ft. diameter kiln. Fig. 21 is a view of a completed 167 ft. long exposed insulating firebrick lining in a 10 ft. diameter kiln.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of February, 1956, were listed by the Portland Cement Association as follows:

	Sq. yd. awarded during February, 1956
Roads	4,319,477
Streets and alleys	2,213,665
Airports	1,726,135
Total	8,259,277

a NEW screen...for NEW profits

in specification aggregates

Here's New proof you get MORE...MORE VALUE when you specify A-C! Every feature of the new Model "S" screen has been carefully calculated to give you outstanding performance at lowest possible cost...

1. **Added screen cloth life** provided by close spacing of clamping bar bolts and by proper camber of deck.

2. **Rigid side plates** reinforced by vertical angles.

3. **Sturdy screen deck frame** features heavy channels, diagonal braces, replaceable cross members.

4. **No metal-to-metal contact.** Full-length rubber buffer strips cushion screen cloth.

5. **Screen surface easy to install** — Surface slides into place over full-length hook supports. Self-locating clamping bar assembly accommodates screen surface of any thickness.

6. **All parts replaceable.** All bolted construction, using locknuts.

7. **Feed box** (optional) absorbs impact of incoming material. Provides uniform distribution when equipped with flow control gate.

8. **Back plate** (standard) **prevents spillage** — adds structural strength.

9. **Springs prevent whipping and breaking** of screen cloth by maintaining proper tension.

10. **Simplified mechanism** assures maintenance economy.

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07B8229.

ALLIS-CHALMERS

A-4975

Some of the 25 Sly Dust Filters at Peerless Cement Corp., Detroit.

Peerless Performance at PEERLESS CEMENT

Complete reclamation of cement dust . . . clean, dust-free plant . . . important operating economies. These are three reasons why Peerless Cement Corp. uses Sly Dust Filters — and has done so since 1924. The reorders are justified by Sly performance. Today, in its Detroit plant, Peerless Cement has 25 Sly Filters in operation — actually 349 lineal feet of filter.

Because of the diversified Sly line, Peerless has the exact filter necessary for each specific operation. Expert filter design and construction mean **peerless** performance at every dust control point — with no appreciable maintenance.

Like Peerless Cement Corp., hundreds of cement plants choose Sly Dust Filters. They offer important advantages in greater filtering capacity, easier bag replacement, automatic control, space-saving installation, and other features that mean low-cost operation.

Sly's 82 years of dust control leadership are reflected by the experienced Sly engineer in your area. He will be glad to discuss your dust control problems with you. For immediate information, write for helpful, free bulletins.

SLY LINE-UP AT PEERLESS CEMENT

FINISH MILL VENTILATION—3 Dynaclones, 3 Automatic-Continuous Filters.

PACKHOUSE VENTILATION—5 Standard Filters, 1 UNIT Filter.

CEMENT SILO VENTILATION—4 Continuous-Automatic UNIT Filters.

BULK TRUCK LOADING—6 UNIT Filters.

JUNCTION HOUSE VENTILATION—(Belt Conveyor Transfer Point)—1 ECONOMY Filter.

PRIMARY GRINDING MILLS' VENTILATION—1 Automatic-Continuous Filter.

LABORATORY GRINDING EQUIPMENT VENTILATION—1 UNIT Filter.

Designers and Manufacturers of: Dust Control Systems, Blast Cleaning Equipment, Tumbling Mills, Industrial Ovens.

THE W. W. SLY MANUFACTURING CO.

SINCE 1874

4746 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

C.A.A. BASE TESTS

(Continued from page 132)

"Designing Flexible Pavements for Strength — Not Thickness" was the subject of a paper given by Raymond C. Herner, Chief, Airport Division, Civil Aeronautics Administration, Indianapolis, Ind. Using slides, Mr. Herner described a recent load transmission research project carried out by the division to ascertain the load carrying capacities of different kinds of granular base materials used under airport runways. The major conclusion was that the strength of the base material should be considered in determining the design thickness, since e.g. a 16-in. base of one material may be equivalent in strength to a 24-in. base of a second but lower quality material. Heretofore, he said, design thicknesses have been based almost entirely upon experience, and generally using the poorest material as a criterion. This new concept should result in reduced construction costs of the base course, without sacrificing strength.

The C.A.A. project involved the use of a specially-designed 10-ft. square mechanical subgrade on which was laid the base course to be tested. This artificial subgrade consisted of 3600 metal plungers, each 2 in. square, placed in a grid pattern. Wheel loads of up to 100,000 lb. were placed on the base courses, and pressures transmitted to the plungers were measured and later plotted on graphs. As expected, the plungers underlying the center of the wheel were subjected to greatest pressure, with the pressure dropping off gradually towards the sides of the testing device. Different base materials tested included crushed limestone (1½ in. to 0, with 6 percent moisture), crushed slag (1½ in. to 0, air dry), clay gravel and washed gravel (each 1 in. to 0, with 6 percent moisture), concrete sand (4 percent moisture) and asphaltic concrete (¾ in. to 0, with 5-6 percent asphalt). In addition, bases consisting of two layers were tested.

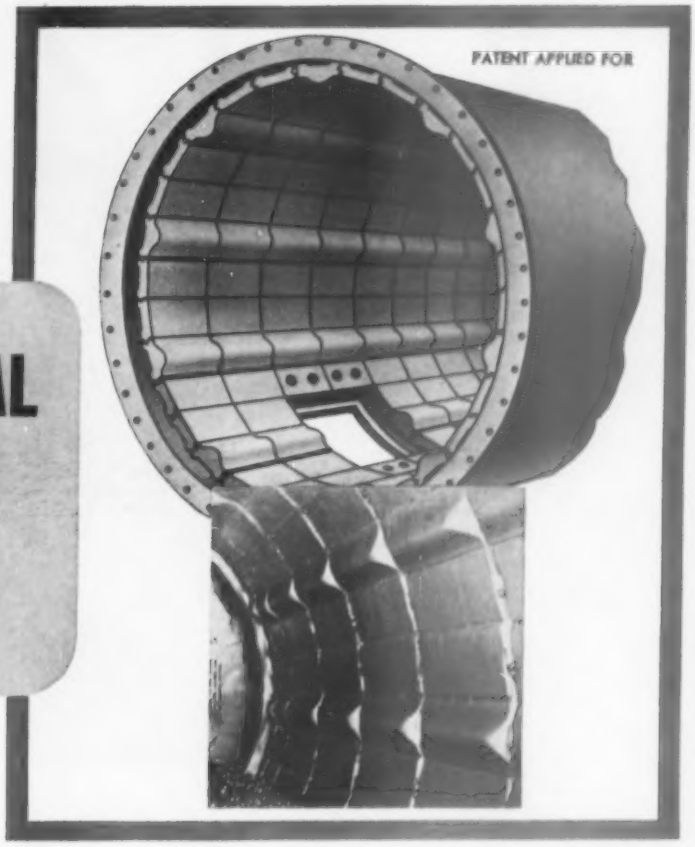
In one test, involving wheel loadings of 24,000 lb., tire pressure of 100 p.s.i. and 24-in. thick base courses, maximum pressures recorded (at the wheel center) were as follows: sand, 19.1 p.s.i.; clay gravel, 17.9; 8-in. gravel on 16-in. sand, 16.5; gravel, 12.9; limestone, 10.6; and slag, 9.2. (The lower value indicates a more effective base). In another test, with 16-in. base courses and wheel loads of 10,000 lb., the pressures were: limestone, 8.8; slag, 9.7; limestone on sand, 11.5; and gravel, 16.4. With 8-in. base courses and 5000-lb. load-

(Continued on page 178)

New

B&W UNIVERSAL LINER PLATES

Raise Performance, Lower Costs



The new B&W Tube Mill Liners have advantages that mean reduced costs in capital, time and labor.

Cost per ton of material ground is reduced, for the practical reasons listed below. Check them—you may find that one, or a combination, of these qualities will solve your existing problems.

- Lower Initial Costs—No pattern and chiller costs —the result of standardization.
- Longer life of liners—Uniform wear will result from better quality control on a mass production casting, utilizing permanent molds. Size is ideal for uniform chill and heat-treatment.
- Longer life for different applications can be realized by a selection of proper materials. This design lends itself to either chilled irons or wear steels.
- Direct labor cost and the "down-time" to install the liners are reduced. Castings are easily handled due to small size and weight. Less fatigue of workers. No cranes needed to handle lightweight liner castings.
- Cost reduced for storage space. Minimum storage space required as small castings "stack" easily. Records simplified with one design of casting interchangeable for all size mills.
- Saves money on liner inventory. One design fits all sizes of mills, permitting standardization. Quicker unloading and storage possible.
- Savings in breakage claims and delays for replacements. Hard brittle irons are frequently broken in shipment when large castings are used. Small castings are rugged and almost impossible to break by handling.
- Savings in determining most efficient wear pattern. Same castings will produce wear profiles consisting of all lifter ribs, all flats or combination of both, including straight or spiralled lifter ribs. Straight or staggered circumferential joints can be used.

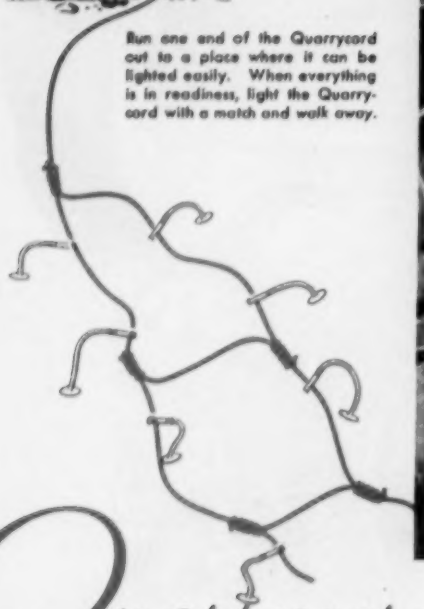
Liners are supplied in two nominal thicknesses, 1½″ and 3″ with 1½″ high lifters. Castings are 6″ wide x 12″ long. Positive seating of small castings on mill shell means less breakage of castings under operating conditions. For additional information on B&W Universal Tube Mill Liner Plates, write The Babcock & Wilcox Company, Process Equipment Dept., Barberton, Ohio.

BABCOCK & WILCOX

BOILER DIVISION

S-448

Run one end of the Quarrycord out to a place where it can be lighted easily. When everything is in readiness, light the Quarrycord with a match and walk away.



Quarrycord

(PLEASE GIVE THIS ADVERTISEMENT TO YOUR BLASTING FOREMAN)

for one-shot lighting of safety fuse in secondary blasting

Now you can ignite each and every safety fuse from *one point*, and eliminate the hazard of men climbing over the rock pile, lighting each fuse individually.

Now you can have the advantage of fuse blasting, so that the holes go "pop-pop-pop" rather than "BOOM" — to reduce the noise of a single blast.

Now you can fire when convenient, without fear of stray electrical currents causing premature blasts.

Quarrycord is a flexible, water-resistant cord which burns with an external flame at the rate of about one foot per second.

It is very easy to use: (1) Prepare each primer cartridge in the usual way with safety fuse and detonating cap. (2) On the end of the fuse opposite the cap place a Quarrycord Connector. (3) Load and tamp the holes. (4) When ready to blast, run a line of Quarrycord so as to connect with each hole (5) At each fuse, pass the Quarrycord into the slot in the end of the connector and press the "lid" down *tight* over it to make positive contact. (6) If your hook-up has parallel lines of Quarrycord, make frequent cross connections as shown.

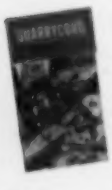
Quarrycord is packed on spools in 500 foot lengths, two spools to a box. Connectors are supplied in cardboard boxes containing 100 each.

For more information see your Explosives Supplier, or write to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut

Manufacturers of Primacord® Detonating Fuse, Safety Fuse, Ignitacord®, Blasting Accessories.

Established 1836



Free Folder tells the whole story: what it does, and how to use it. Every Blaster should have a copy — send for it today.

ENSIGN-BICKFORD

Quarrycord

for lighting Safety Fuse in Secondary Blasting

Q-4

INFORMATION

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

1 AIR COMPRESSORS — American Brake Shoe Co., Kellogg Division, has issued a folder on its Utility Line of air compressors for general automotive, farm, home, and industrial use. The illustrated brochure includes data on 19 models of compressors ranging from ⅓ to 1¼ hp. in the 125 to 150 p.s.i. range with various types of drives.

2 ALLOY FLUX AUTOMATIC WELDING —The Lincoln Electric Co. has published Bulletin S-101 10M, on the automatic welding of alloy steel with mild steel electrode and alloy flux. Standard procedures, applications, and a list of special alloy fluxes for chromium, molybdenum, vanadium and nickel are listed.

3 BELT CONVEYOR IDLER — Link-Belt Co. has released Folder 2516, describing and illustrating the Series 50 ball bearing belt conveyor idler, available in greasable and factory sealed types for seven belt widths ranging from 14 to 36 in. Specifications, parts photographs, and line drawings are included.

4 BELT CONVEYORS—Barber-Greene Co. has released Form 3547 on its Model 375 transfer conveyor, a belt conveyor for short hauls in lengths of 1-ft. increments from 8 ft. in 18-, 24- and 30-in. belt widths. Typical application photographs are included.

5 BULLDOZER—Clark Equipment Co., Construction Machinery Div., has brought out literature describing and illustrating the Michigan Turbo-Dozer, a 2¾-cu. yd. capacity bulldozer combining rubber-tired speed and mobility with traction power. Typical application photographs, description of features, and data on the unit's power-shift transmission are given.

6 CENTRIFUGAL PUMPS—VALVES—McNally Pittsburg Manufacturing Corp. has issued a 20-page bulletin, No. 1055, giving technical data on the various sizes of its centrifugal pumps and valves. Photographs, dimension drawings, data tables and performance curves are given. Also included is a complete description of the various type of valves manufactured by the company.

7 CONCRETE EQUIPMENT—Stow Manufacturing Co. has announced a 16-page catalog, No. 560, illustrating and describing concrete vibrators, portable concrete grinders, vibrating screeds, and rotary trowels. Complete data and specifications of its line of gasoline and universal electric vibrators are given, as well as accessory and attachment lists for all of its equipment.

8 CONCRETE GARBAGE DISPOSAL — Davidson Excavator Co. has issued a brochure telling how to manufacture and market a concrete garbage disposal unit, explaining franchise arrangements. A complete description of how the unit operates is also given.

9 CONVEYORS—Barber-Greene Co. has published a 192-page conveyor catalog, describing the advantages of its line of conveyors. More than 85 job photographs and 16 plant layouts are also included.

10 CORROSION PROOFING MATERIALS—Pennsylvania Salt Manufacturing Co., Corrosion Engineering Dept., has issued an eight-page illustrative booklet entitled "Corrosion Proofing," describing various Pennsalt materials for corrosion proof masonry construction and techniques for application. Detailed information is given on cement mortars, interliners for masonry construction and protective coatings and linings for surface treatment.

11 CRAWLER TRACTORS—American Tractor Corp. has issued a 12-page booklet entitled "The Crawler . . . Backbone of Construction," illustrating how and where the 30 to 60-hp. TerraTrac tractors fit in the construction picture. Five gasoline and three diesel-powered tractors are featured, as well as a complete selection of matching loaders, dozers, backhoes, scarifiers, winches, etc. Data is also given on the torque converter drive and hydraulic power-shifting transmission.

12 DIAMOND BITS — Sprague & Henwood, has announced Catalog 320-1, illustrating and describing all types of oriented diamond coring bits, non-coring bits, casing bits, casing shoe bits, reaming shells, impregnated coring bits, etc.

13 DIESEL ENGINES — Caterpillar Tractor Co. has issued a 16-page booklet entitled "Why Cat Diesels Are Best," form No. DE605, listing advantages and features incorporated in the manufacture of its diesel engines. Turbocharging is discussed and a schematic drawing is given. Typical application photographs and accompanying testimonials are shown throughout the booklet.

14 DIESEL TUGS—Fairbanks, Morse and Co. has released a 56-page booklet on the problems and accomplishments in the design and operation of diesel tugs. Entitled, "A Presentation of Modern Diesel Tugs," the booklet is written specifically for owners and operators of tugs, discussing modern operating conditions for tugboats. The evolution in design, power plant and construction to meet increasingly rigid requirements is given.

15 DOUBLE ROLL CRUSHERS—McLanahan and Stone Corp. has issued Bulletin DR-256, on its double roll crushers for finer reduction of medium size feeds. Dimensional drawings with a table indicating sizes for basic components of the 25 detailed crushers are included. A parts list, specifications, and a formula with accompanying tables for determining crusher capacity for various roll setting and size combinations, are also given.

16 ELECTRIC PLANTS — International Fermont Machinery Co., Inc. has published an eight-page manual entitled "Engineered Kilowatts," describing electric plants, powered by internal combustion engines, ranging in capacity from 5 kw. through 250 kw., designed for automatic or manual starting. The manual, Bulletin 955, also lists reference material, forms and check lists, as well as specifications and a list of available data covering such items as installation and automatic starting controls.

17 ELECTRICAL PRODUCTS — Cole-Hersee Co. has published a 20-page catalog of electrical products for farm tractors, earthmovers and industrial equipment, designated Form D-176. Illustrations and descriptions are given of switches, connectors, pilot and dash lamps, fuse and terminal blocks, etc. In addition to original equipment products, a replacement listing of electrical components is given for all leading makes of tractors and similar equipment.

18 FRONT PALLET FEEDER—Bergen Machine & Tool Co., Inc. has available literature describing and illustrating its front pallet feeder for installation on concrete block machines. Operational diagram, features, and cost, including installation supervision, are included.

19 FORK LIFT TRUCKS—Towmotor Corp. has announced Vol. 14, No. 1 of "Handling Materials Illustrated," featuring an article on all-weather stockpiling operations involving specially equipped fork lift trucks. Also included is a fully illustrated series of materials handling case histories covering the economies effected by fork lift trucks in handling a variety of materials.

20 GRADERS—Huber-Warco Co. has issued a 16-page bulletin and complete specification sheets on two motor graders, the 102-hp. 6-D and 140-hp. 7-D. Bulletin HWG-521 covers features of both machines, and a special historical section shows the world's first motor grader and the first grader with hydraulic controls. Optional equipment and typical application photographs are included.

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21 INDUSTRIAL TRACTORS AND EQUIPMENT—John Deere Industrial Division has issued a 23-page booklet illustrating and describing the line of John Deere industrial tractors and equipment. Specifications, performance testimonials, and feature descriptions are given for equipment including loaders, scarifiers, winches, log carts, backhoes, rear scrapers, generators, plows, trenchers, dozers, blades, hydraulic mowers, industrial pumps, etc.

22 LATEX CONCRETE TOPPING — The Camp Co., Inc. has literature available on its Latex Concrete Topping, for smoothing or patching concrete indoors or outdoors. The topping is claimed to be waterproof, grease and oil resistant, and lactic acid resistant.

23 MOISTURE METER—Sarasota Engineering Co., Inc. has issued a brochure describing and illustrating an H_2O meter for aggregates in bins, for instantaneous moisture readings. Installation instructions and sketches are given, as well as a technical description.

24 MOTOR-CRANE—The Thew Shovel Co. has published a catalog describing two 25-ton Lorain Moto-Cranes, Models MC-425 and MC-425W. Descriptions of several additional features are given, as well as typical application photographs.

25 MOTOR TRUCK OPERATION COSTS—The White Motor Co. has announced the "Cost Record Book" for keeping an accurate record of truck operation costs for a period of one year. Tables for listing miles traveled, payload, fuel, oil, all maintenance and repairs, drivers and helpers wages, accidents, body repairs, etc. are given for each day. A monthly cost summary is also given.

26 OXYGEN ANALYZER—The Hays Corp. has released a 16-page color catalog, No. 55-829-56, explaining the principle, construction, operation and features of the paramagnetic type Magno-Therm analyzer and the electronic recorder. A chart of major applications lists functions, examples of services, and how and why the analyzer is used. Special models are also described.

27 PORTABLE BATCHING PLANTS—Blaw-Knox Co., Construction Equipment Div., has released a 41-page illustrated booklet, No. 2488, covering portable bulk cement plants, portable aggregate plants, and portable one-stop plants. Features, capacities and dimensional data are given on each type of plant. A check list in the back of the bulletin itemizes points of consideration before buying a plant.

28 ROCK BLASTING—Atlas Copco Eastern, Inc., has announced the publication of the third regular supplement to the "Manual On Rock Blasting." The supplement contains latest engineering and technical reports on the calculation of charges for bench blasting and stoping, location and design of permanent compressor plants and a review of tungsten carbide bit development and utilization in percussion drilling.

29 ROOF AND FLOOR SLABS—The Flexicore Co., Inc., has published a 16-page booklet entitled, "Schools with Flexicore," giving plans and detail drawings of recent projects designed by school architects, utilizing floors and roofs of Flexicore concrete slabs. Along with drawings showing typical usage, the booklet also illustrates how the system speeds construction and how the structural units can provide finished, low-maintenance ceilings, heating ductwork and overhangs.

30 ROTARY AIRLOCK FEEDERS — Prater Pulverizer Co., has brought out Bulletin P-55, describing and illustrating its rotary airlock feeders, including the standard duty series, heavy duty series, and the Blow-Thru feeder. Dimensions, capacity charts, engineered drawings and specifications are given, as well as a list of companies with feeder installations.

31 RUST PREVENTION—Rust-Oleum Corp. has prepared Form 255, the 1956 general catalog on rust prevention with illustrations of Rust-Oleum uses and applications throughout industry. Included are 102 color chips of colors available in primers, short oil type coatings, oil field finishes, machinery and implement colors, long oil type coatings, galvinoleum coatings, heat resistant coatings, chemical resistant coatings, and floor and deck coatings.

32 SKID-SHOVELS — International Harvester Co. has issued two folders entitled, "Versatility Unlimited" and "Four-Machine Utility," which detail operating features and advantages of the International Drott Four-In-One skid-shovels. The mechanical features of the four-in-one are given, which is available for International TD-6, TD-9, and TD-14 crawler tractors. The folders are designated Forms CR-405-F and CR-406-F.

33 SPACE SCREENS — The Colorado Fuel and Iron Corp., has prepared a four-page illustrated booklet describing its line of Wissco-loy Space Screens. A complete listing of standard specifications is given, as well as recommended applications and suggestions as to ordering.

34 TRANSIT MIXERS—LeTourneau-Westinghouse Co., Westinghouse Transit Mixer Div., has announced a 16-page illustrated bulletin, No. 256, covering the complete line of 1956 Westinghouse transit mixers, including five new models, 4½, 5, 5½, 6, and 6½ cu. yd. capacities. Dimensions and specifications are given, as well as descriptions of various features. A complete line of optional euipment is also shown.

35 USE OF EXPLOSIVES—Atlas Powder Co. has issued a bulletin entitled "Prevention of Accidents in the Use of Explosives," which was recently approved by the Institute of Makers of Explosives. Do's and don'ts are given on transporting, storing, using, drilling and loading, and tamping explosives, as well as instructions on shooting electrically, shooting with a fuse, underground work, before and after firing, disposal of explosives, etc.

36 VERTICAL SOLID SHAFT MOTORS — U. S. Electrical Motors, Inc. has published Form F-1868-100m-1-55, describing and illustrating U. S. Unimount motors, both vertical solid shaft and horizontal footless motors. The full-color booklet gives cutaway illustrations of the motors, pointing out various construction features, and also illustrates lubrication systems.

37 VIBRATING SCREENS—Smith Engineering Works has released Bulletin 290, covering Telsmith vibrating screens including heavy duty scalpers and two types of finishing screens, in both two-bearing and four-bearing models. Complete specifications for all models are given, as well as typical application illustrations.

38 VIBRATION MOUNTINGS—T. R. Finn & Co., Inc., Industrial Div., has released Catalog RS-55, describing a complete line of Rubber-in-Shear vibration mountings, known as Finnflex mountings. Construction features, such as "floating action" of the precisely loaded rubber-in-shear that provides maximum flexibility and isolation, are described. Various types of vibration mountings, with load capacities ranging from 40 to 10,000 lb., are described, as well as the non-walking base-plates.

39 WHEEL-TYPE TRENCHLINER—Parsons Co., subsidiary of Koehring Co., has published a 16-page catalog describing the wheel-type Trenchliner, featuring hydraulic power for raising and lowering the digging wheel. Photographs and drawings illustrate the hydraulic power system for the Model 150 Trenchliner, and typical application photographs are used throughout.

40 WOBBLER FEEDER — Universal Engineering Corp. has issued Form B 424-561, describing and illustrating the Universal Wobbler Feeder which feeds and scalps in one operation. Engineered drawings, specifications, and a typical portable installation are given.

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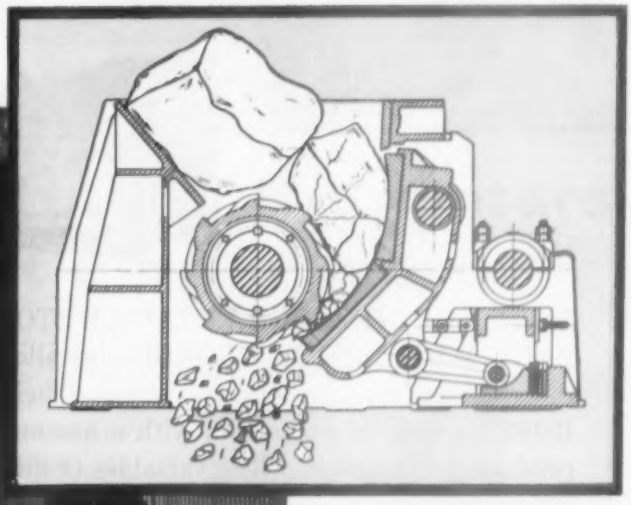

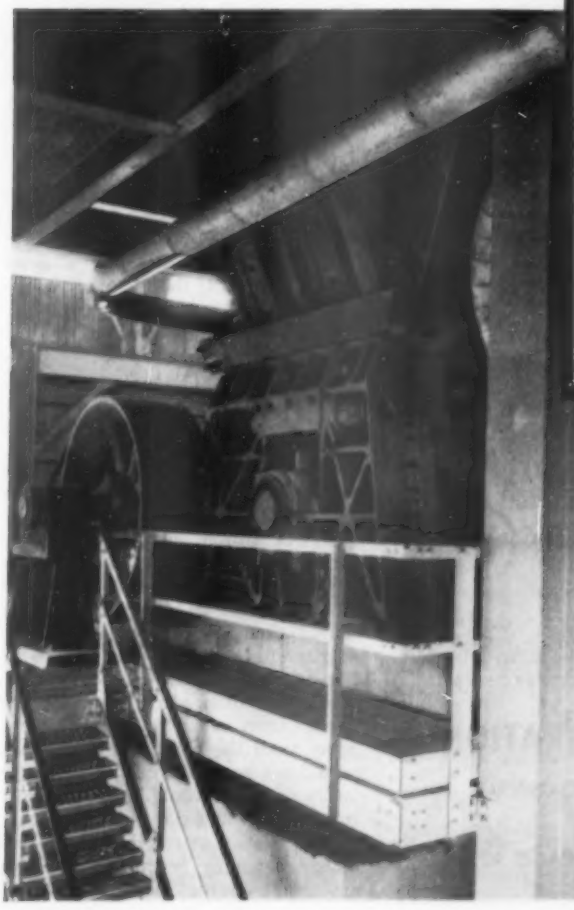

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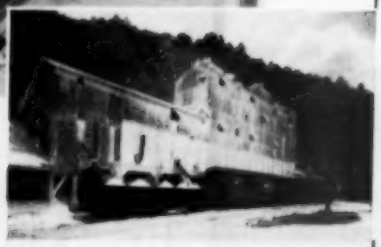
SINGLE ROLL CRUSHERS

PE-214

LARGE SOUTHERN PRODUCER OF AGSTONE HAS USED GYROSET SCREENS FOR 14 YEARS



In 1942 THE WILLINGHAM LITTLE STONE COMPANY, WHITESTONE, GEORGIA, installed a 4′ x 10′ three-deck open suspended, oil splash lubricated GYROSET screen in connection with a hammer mill for producing fine agstone. The variables (8 different amplitude settings, 0 to 3/8″, patented) custom fit this particular screening job.

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PERFORMANCE IS ALWAYS THE BEST PROOF OF GOOD SERVICE

WRITE US REGARDING YOUR FINE STONE SCREENING PROBLEMS

PRODUCTIVE EQUIPMENT CORPORATION

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— OVER 25 YEARS —

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C.A.A. BASE TESTS

(Continued from page 172)

ing, the pressures varied from 23.4 for clay-gravel to 15.3 for limestone. In another test involving identical wheel loading of 20,000 lb., the pressure curves across the device were practically identical for a 16-in. limestone base and a base consisting of 8-in. gravel and 16-in. sand.

Another illustration gave an economic comparison of equivalent pavement sections, as follows: 8-in. normal gravel plus 16-in. sand, $3.15 per sq. yd.; 21-in. normal gravel, $4.00; 26-in. clay gravel, $4.30; 17.5-in. slag, $5.75; and 16.5-in. crushed limestone, $3.75. These costs included both material (at local market price) and installation. In presenting these data, the speaker emphasized that the results applied only to the materials tested and under the test conditions; they are not to be taken as final conclusions. He added that many variables have still to be tested.

Mr. Herner also described a few preliminary triaxial tests performed by his division, in which specially-prepared test specimens of the base materials were subjected to vertical pressures up to 175 p.s.i. and lateral (air) pressures up to 10 p.s.i. These tests were made to determine failure in shear of the various materials.

From these load transmission and triaxial tests, the speaker concluded that there are wide differences in the physical qualities of base materials and their effectiveness to do the job. These variations are measurable, translatable, and of economic importance. He emphasized, however, that the C.A.A. tests represent only a good start in "reducing the factor of ignorance."

WAGE-HOUR ACT

(Continued from page 144)

trict of Columbia. The act covers mechanics and laborers employed by the contractor or subcontractors at the work site. Thus, a ready mix firm which sets up a plant at the job site would be considered a subcontractor and certain employes (those performing manual labor) would be covered by the act. He cited one court ruling stating that truck drivers delivering aggregates to the job-site plant were also subject to the Act. However, ready mix truck drivers serving the project from a ready mix plant located away from the construction premises would not be covered; in this case the ready mix firm would be considered a materialman and not a subcontractor.

Mr. Horsky stated that the Davis-Bacon Act may become much more important to the industries than at

Amsco "WEAR-SHARP" Repointers outlast 2-part dipper teeth

One of the largest contractors on the St. Lawrence Seaway Project proved our point! He switched from two-part dipper teeth to Amsco® "WEAR-SHARP" Repointers, with grooves filled in by hardfacing.

Result: according to the contractor's own report, he's getting much better service life out of the tooth. And, in really rugged service, the teeth retain their cutting edge much longer . . . helping to maintain digging speed and conserve power.

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Hardface with Amsco Hardfacing Alloys and Welding Equipment, too!

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. . . have grooves on each end and on corner faces, which can be filled in with a tough hardfacing deposit. This equalizes wear and maintains a sharp cutting edge, prevents teeth from rounding or blunting. Available straight (as shown) or with crescent-shaped backs.

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Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

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YOU CAN CHANGE SEVEN *ESCO* TESTED POINTS IN SEVEN MINUTES

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You don't change self-sharpening *ESCO* points often but when you do you get sharp points *fast.* Just drive out the pin with a hammer and punch. There's always plenty of room to work on *ESCO* Points. Slide on the new point... put in the pin and drive it home. That's it! You're ready to go. Start using faster-digging, money-saving, *ESCO* Points today. Your *ESCO* Dealer will be happy to give you details.

1 *Just knock the pin out*

2 *Insert new point and drop in pin*

3 *Drive pin back in*

THE HEART OF AN *ESCO* POINT ADAPTER

Tapered alloy steel locking pin and rubber locking plug holds point securely in place.

Rubber locking plug has alloy steel core for positive action and long life. Same pin and plug can be used many times.

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present, since the Act has been extended by special provisions to many classes of construction which are financed in whole or in part with federal funds.

Other federal statutes of lesser importance discussed by Mr. Horsky included the Eight-Hour Law, Copeland Act, Miller Act, and the Walsh-Healy Act. He stated that all of these statutes may apply at the same time, and when they do, the employe gets the advantage of the one which gives the most money. A hypothetical case of multiple application was given as follows:

"A ready-mixed concrete firm agrees with a construction contractor, under a $100,000 contract for the construction of a federal building, to furnish the materials for and to mix at the construction site all of the ready-mixed concrete needed for the job. In the performance of this contract the concrete firm produces the crushed rock at a quarry and crushing plant located in another state. Some of the ready-mixed concrete firm's truck drivers deliver the rock to the site from the plant. The cement is purchased from a cement dealer whose offices and warehouses are in the same state as the construction project, and other truck drivers for the ready mix firm haul the cement from the seller's warehouse to the construction site.

"Under this illustration, the following laws apply:

a. The firm is a "subcontractor" under the Davis-Bacon Act, the Eight-Hour Law, the regulations to the Copeland Act, and the Miller Act.

b. It is furnishing materials under a construction contract, and hence is exempt from the Walsh-Healy Act.

c. Its employes engaged in producing crushed rock, which is delivered across the state line, are covered by the Wage-Hour Act.

"What it must do, therefore, in terms of applicable labor standards is the following:

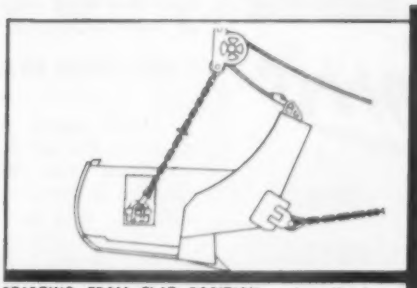
(a) To comply with the Davis-Bacon Act and the Eight-Hour Law, it must pay its production workers on the construction site, and the truck drivers who deliver rock or cement, not less than the prevailing wages and time and a half for daily overtime work.

(b) To comply with the Wage-Hour Law, it must pay at least minimum rates and weekly overtime to all of its employes at the quarry and crushing plant who are engaged in producing goods which will move across the State line, and must do the same for the truck drivers who haul the rock.

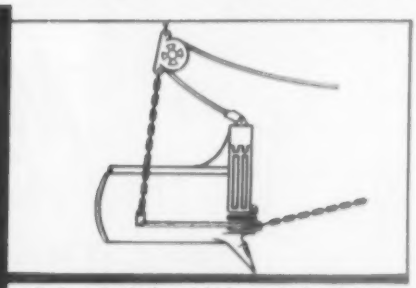
(c) To comply with the Copeland Act, it is responsible for avoiding "kick backs" of employes working at the construction site and of all the

...Here's Why Page AUTOMATICS Outperform Ordinary Buckets...

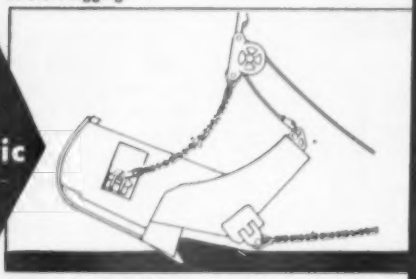
Page Automatic Bucket Action



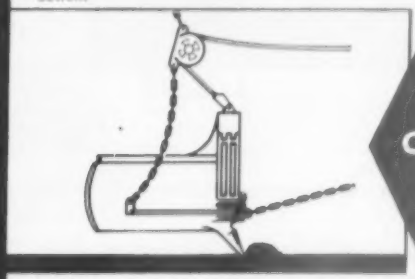
STARTING FROM FLAT POSITION, automatic is ready for pull — no need to drop it on its teeth to start digging.



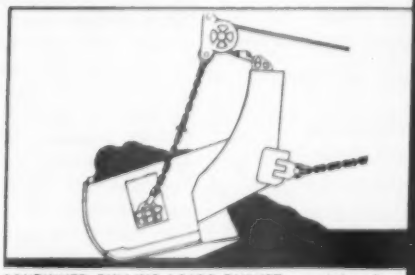
Ordinary bucket's weight is evenly distributed . . . depends on sharp angle of teeth to begin digging action.



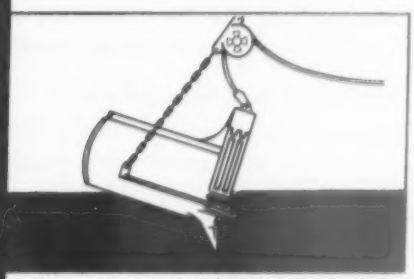
FIRST PULL ON LOAD LINE automatically shifts full weight of Page Bucket to the teeth and bucket begins digging immediately.



Bucket is dragged until teeth catch or snag on soft ground or projection before digging in.



CONTINUED PULLING LOADS BUCKET — weight of load shifts center of balance to the rear, causing the bucket to come up automatically as it finishes loading. Completely filled in 1 or 2 lengths, bucket is ready for fast hoist and dump.



Sharp angle of teeth and flat balance of ordinary bucket cause it to keep digging in as pull is continued. Bucket must be jockeyed and pulled loose from ground before hoisting.

This is how Ordinary Buckets Work

AUTOMATIC'S DIGGING ABILITY PAYS OFF IN GREATER PRODUCTION

The test of a dragline bucket's value to you is the yardage it can handle in a given time. Page Automatic Buckets *will produce more yardage per rated capacity than any other bucket.* Let us give you a demonstration. We will put the right Page Automatic on your machine and prove that it will increase production by as much as 10 to 25%.

Write us for details and Bucket Catalog GPB454. There's no obligation.

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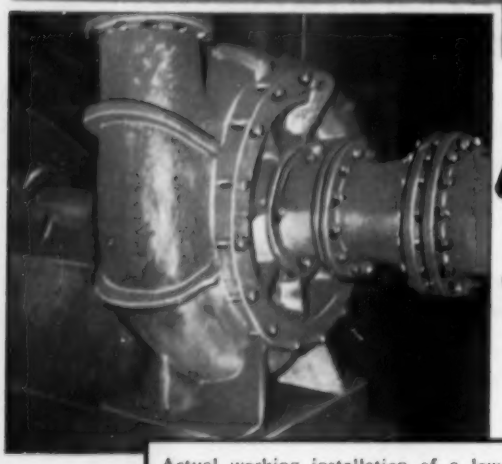

Morris

low-speed wide-clearance SOLIDS PUMP

Actual working installation of a low-speed, wide-clearance Morris Solids Pump which handles fine solids at a rate of 6,000 gpm at 52′ total head. Pump speed only 370 rpm, 14″ suction opening, 12″ discharge.

Where total heads do not exceed about 120 feet, low-speed, wide-clearance Morris Type-M Solids Pumps will handle solids ranging from fine abrasives up to pieces 11″ in diameter. The low-speed reduces the abrasive action of the smaller particles, the large clearance allows larger solids and "tramp" pieces to pass without trouble.

Longer Wear, Easier Maintenance

Designed so that the most important wearing parts receive the least wear, initial high mechanical and hydraulic efficiencies are maintained throughout the longer service period of the pump. Double-thick wearing parts are sub-divided and protected so that the greatest erosion is taken by easily replaced segments. That means speedy, easy renewal, less down-time and lower maintenance cost.

Free Consultation

Morris engineers are always available to discuss and study your pumping problems with you. Describe your needs in a letter—or call your nearest Morris office. Our recommendations are free—entail no obligation. Write for Bulletin 175 which describes the Type M Solids Pump in detail.

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MORRIS *Centrifugal Pumps*

truck drivers, and must submit certified payrolls and weekly affidavits showing wages and hours worked by such employes. Employment records must be preserved for three years.

(d) To perform its duty to the prime contractor in connection with the Miller Act, the ready-mixed concrete firm must make certain it has all of these obligations."

OPERATING PRACTICES

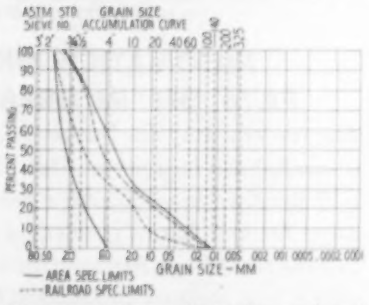
(Continued from page 150)

If coarse aggregate is crushed, the shape of the coarse particle was less important than the finer dust. The speaker, in answer to a question from the floor, held that a minus 30 mesh natural sand was usually less angular than a crusher product of the same fineness.

Railroad Ballast

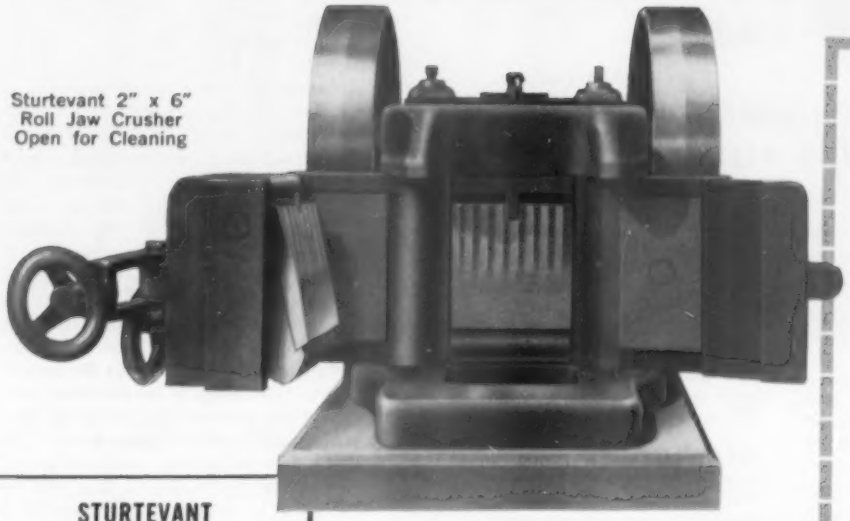
A paper on "Properties of Sand and Gravel for Railroad Ballast" was presented by Rockwell Smith, Research Engineer Roadway, Association of American Railroads. The speaker said that in 1952, Class 1 railroads spent $35,000,000 for ballast material chargeable to operations, plus an additional $14,000,000 for other ballast requirements. To date $831,000,000 has been invested in ballast. He gave old and later definitions of ballast, and said that sand and gravel adequately answered all these definitions. From the paper it appeared that the specification picture concerning ballast was a little uncertain when specifications vs. serviceability was concerned. He described and showed slides of an oscillator to give a simulated loading test on a panel of track with a 5-ft. test section from which the ballast can be reclaimed after the test. Present procedure, he said, is to load the section under the oscillator for five and one-half million cycles, the equivalent of 60 million ton miles of traffic.

Slides were shown illustrating the way the tie bears on the ballast, and



Shows specification limits for sand and gravel as it occurs in the A.R.E.A. manual. Broken lines show limits for one railroad's purchase of ballast from commercial sources; crushed particles amount to 20 to 40 percent of the amount retained on the No. 4 screen

"OPEN-DOOR" DESIGN CUTS SAMPLING TIME



Sturtevant 2" x 6" Roll Jaw Crusher Open for Cleaning

STURTEVANT LABORATORY EQUIPMENT

ROLL JAW CRUSHER

First choice for hard rocks. Jaw opening — 2 x 6 in. Approx. capacity: ⅛ in. setting — 700 to 800 lbs. per hr.; ¼ in. setting — 1000 to 1200 lbs. per hr.

CRUSHING ROLLS

Two sizes: 8 x 5 and 12 x 12. Outputs range from ¾ in. to 20 mesh at capacities from ¼ to 10 tons per hr. Performance varies with materials.

SWING-SLEDGE MILLS

For pulverizing soft, hard, tough or fibrous materials ranging from 1 in. to 20 mesh. Feed opening — 5 x 6 in. Capacities at 250 lbs. to 1 ton per hr. for 10 mesh, depending on materials.

SAMPLE GRINDER

Produces samples between 10 and 100 mesh with simple handwheel adjustments. Capacity up to 200 lbs. per hr. with ¼ in. or finer feed.

Small-Scale Duplication of Full-Scale Production

All Sturtevant Laboratory Equipment is ruggedly constructed. So much so that it is used in regular plants for round-the-clock operations. Exclusive "Open-Door" design makes cleaning and maintenance between sample runs quick and easy.

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My dry-process materials are _____

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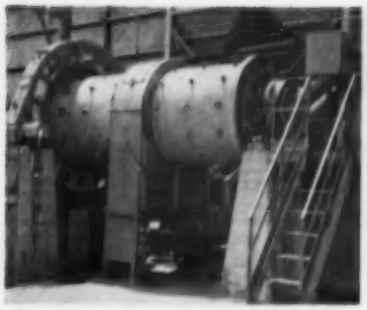


Typical installation of Marcy CPD Mill

how
MARCY
EXPERIENCE
grinding specification sands
gives you
BETTER SAND PRODUCT...LOWER OPERATING COSTS... GREATER FLEXIBILITY IN MEETING SPECIFICATIONS

Mine and Smelter has specialized in the design and manufacture of Marcy grinding mills since 1915. Extensive experience in the stone products field resulted in development of the Marcy Center Peripheral Discharge Grinding Mill. This development, initiated in 1940, has resulted in a great number of sand installations for government projects and commercial operations.

BETTER SAND PRODUCT

Grinding in a Marcy CPD Mill produces a uniformly cubical shaped product with same characteristics of shape and strength throughout the range of sizes produced. This results in:

- stronger concrete
- better finish on concrete
- better slump characteristics
- use of less cement

OPERATING ADVANTAGES

Compared with crushing, experience has proved these additional advantages of grinding by Marcy CPD Mills:

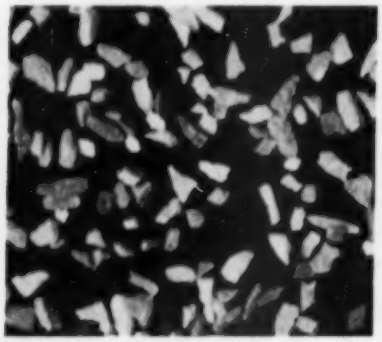
LOW COST ... low maintenance, less steel consumption and less power per ton result in an overall cost generally less than 25c per ton, exclusive of ammortization.

FLEXIBILITY ...by varying rate of feed, pulp dilution and discharge port area it is possible to change gradation of finished product to meet different specifications.

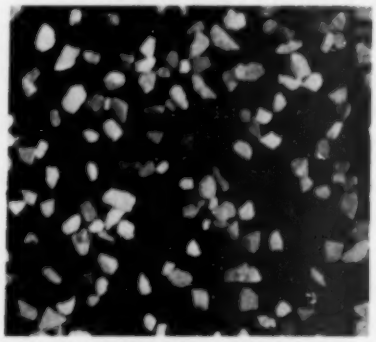
CLEANER OPERATION

WET OR DRY GRINDING

CAPACITIES FROM 2 TO 200 DRY TONS PER HOUR



CRUSHER PRODUCT



MARCY CPD MILL PRODUCT

Identical rock samples were put through a crusher and a Marcy CPD Mill. The resulting products, screened to −10 +14 mesh, are shown above. Note the elongated shape and sharp, weak edges of the crushed product compared with the uniformly cubical Marcy Mill product.

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the resulting bending moment as well as slides showing wear on ties after long service. A total of four slides were used relating to stresses in railroad tracks, a center-bound, or "rocking chair" tie, vertical pressure distribution at several sections, and typical railroad ballast cross sections. Other slides referred to gradations of ballast.

The speaker said that the use of sand and gravel as ballast on the Class 1 lines had declined and attributed this in a measure to depletion of many deposits. He said the market could be economically reclaimed by the industry, tailoring their products to meet the railroad needs, for basically sand and gravel has all the qualities necessary to make first class ballast. In conclusion the speaker said: "... The evidence developed by the present series of tests points the way toward a more complete study of the effect of particle shape, the effect of gradation, crushed particles and the fines on stability. Also indicated is a more complete investigation into the nature of the fines such as permeability and cementing powers; also effect of unit weight and capillary properties. ... It is the firm belief that sand and gravel ballast can be produced that will be the equal in service of any material at a probable lower cost."

Controllers Conference

A special feature of the National Sand and Gravel Association and National Ready Mixed Concrete Association conventions was the second joint controllers conference held Monday afternoon, February 13. Participants in an informal panel discussion of fiscal and accounting problems were Paul J. Kremer, Buffalo Slag Co., Inc., Buffalo, N. Y.; John T. Sapienza, association tax counsel; Henry H. Kirwin, Eastern Rock Products, Inc., Utica, N. Y.; Eugene J. Halter, J. K. Davison & Bro., Pittsburgh, Penn.; and J. H. Reid, Standard Paving & Materials, Ltd., Toronto, Ontario. Subjects discussed included income tax planning, budgets, man-hour studies, break-even charts, graphic analysis of sales, credit and collection, insurance, etc.

Mr. Kremer presented a progress report of the subcommittee on revision of the cost accounting manuals which were originally published in 1948. Teams are presently working on each of three new manuals — for ready-mixed concrete, land-based sand and gravel operations, and marine sand and gravel operations. Rough drafts of the new manuals are expected to be finished in April, and each will be sent to 15 companies in each category for criticism. Mr. Kremer urged that

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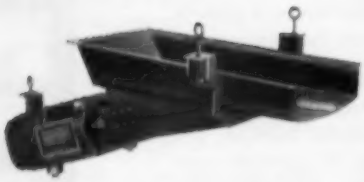

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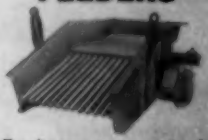

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each of these firms carefully study the revised manual and offer helpful suggestions. He thought the new manuals would be published in time for distribution at the 1956 annual meeting.

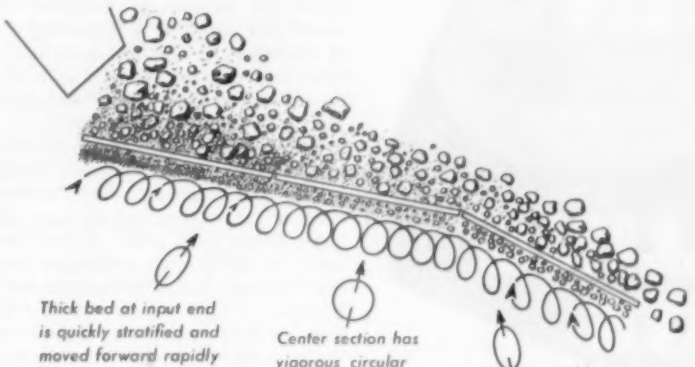
In discussing business planning, the panel agreed that budgets are absolutely necessary for the successful operation of any business. Mr. Reid, whose company has used budgets for many years, termed the budget a blueprint embracing all functions of business which is based upon a common denominator, the dollar. He stated that his company is constantly striving to improve its budgeting methods, and has followed the practice of revising the budget every month or so in the light of new conditions. He added that budgets aren't curealls. Mr. Kremer pointed out the need for a budget if the company has to finance an expansion program.

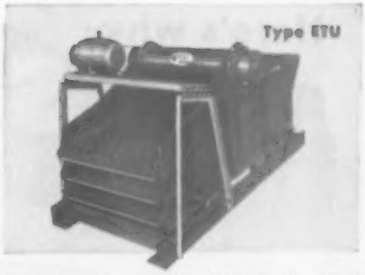
Mr. Kirwin discussed cost analysis in conjunction with his company's operating council. The council consists of all plant superintendents as well as members of top management. Meetings are held monthly in order to discuss operating and sales budgets of the month just passed for each plant. Free interchange of information coupled with knowing where management stands on matters, results in a good esprit de corps in the entire organization, he remarked. Comparison of operating problems and costs of the various plants also has been instrumental in improving overall efficiency and in reducing costs.

The panel also discussed credit bureau organizations which are instrumental in allowing the companies to stay on top of slow accounts. Mr. Halter reported on the Construction Credit Bureau in Pittsburgh which is part of the Credit Men's Association of Western Pennsylvania. The group, consisting of 28 members from the building material and allied fields, meets every two weeks to discuss overdue accounts and other credit matters. Coded lists of slow paying concerns are made and distributed to the members. This service is paid for primarily from annual dues which may amount to several hundred dollars. The dues also cover services for preparing up to as many as 10 property reports (for titles). Mr. Halter stated that these credit lists not only aid in collection but also in guiding company salesmen in soliciting new business.

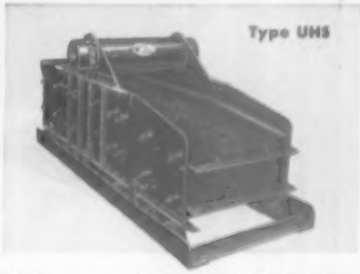
One panel member reported using Dunn and Bradstreet for securing initial and follow-up data on contractors. Another reported getting data directly from the state as to amount and date of estimate checks sent out to contractors on state jobs.

(Continued on page 188)


Thick bed at input end is quickly stratified and moved forward rapidly to spread heavy bed
Center section has vigorous circular throw for accurate sizing of thinned bed
Holding action to retain near size material for maximum grading



End tension, featuring the longitudinally curved screen surface in combination with the opposed elliptical throw of the Unitized Lifetime Vibrating Mechanism, available in 1 to 4 decks, from 2½' x 4' to 5' x 10'.



Side tension screen featuring adjustable slope panels. Divided screening sections, identical in size, permit shifting to distribute wear. 1, 2 or 3 decks in sizes up to 6' x 16'.

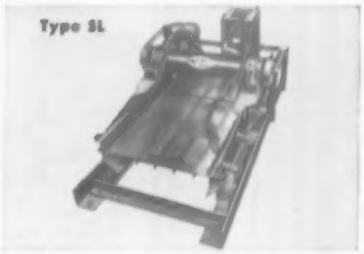
How to select sizing equipment

Most aggregates producers are caught in a three-way squeeze . . . rising production costs . . . more rigid specifications . . . and stiffer competition. It takes the best in screening equipment to meet this challenge . . . big capacity, cost cutting, hard working screens . . . in a size and model selected to do your particular job best. Several leading manufacturers can claim these advantages. But, before you invest, investigate the screen that has all these . . . and many *exclusive* features in addition that make it stand out from all the rest.

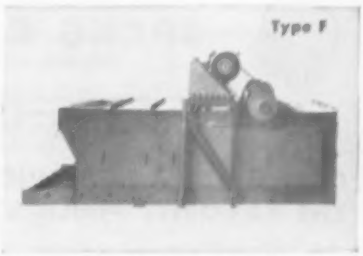
Deister's exclusive "Opposed Elliptical Throw," for example, accurately controls the movement of material on the screen for greatest speed and efficiency in sizing . . . provides more capacity per square foot.

And, don't overlook Deister's exclusive "Unitized Lifetime Vibrating Mechanism." It's a precision-constructed, jig-assembled unit . . . demountable and readily interchangeable. Mounted well above heat, grit and dirt, it features renewable sleeves to prevent wear on bearing housings and shafts, and it operates in a bath of oil.

Among others, remember that Deister screens are backed by a follow-through parts and service policy without equal, for Deister top management is personally interested in the continued, profitable operation of every Deister screen in the field.



Ag-lime screen . . . handles fine, damp materials at high capacity without blinding because of much longer stroke, higher speed and with graduated stroke feature.



Horizontal screen for installations with low headroom. Features the Deister drop-deck, providing greater screening area for the critical sizes.

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3. The BLADE SECTIONS of SPANG BITS, designed for maximum penetration in hard formations, have ample water course to provide more room for cuttings and faster drilling action in sticky formations.

4. SPANG BITS are furnished with *semi-dressed drilling ends* which permits a bit to be dressed out to gage in less time and with fewer heatings.

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CONTROLLER'S CONFERENCE

(Continued from page 186)

Mr. Sapienza discussed various phases of the income tax problem. He stated that Schedule F regarding life of machinery is now obsolete; he felt that each company should use its own experiences in determining machinery life for depreciation purposes.

To cut insurance costs, one panel member reported his company changing from the standard plan to a retrospective (experience) rating plan. The latter allows for a rebate of insurance costs (in dividends) contingent upon the company having low accident experience. It was pointed out that the cost of this new plan equalled the standard plan if the loss through accidents amounted to about 32 percent of the premiums paid. With this company, the annual losses have varied from only 15 to 25 percent, meaning a savings in insurance costs under the new rating plan of as much as 20 percent.

Another panelist suggested that insurance costs may be cut by re-examination of the entire insurance portfolio by either the insuring company or by an independent insurance analyst. If the former, he suggested that the home office rather than the local underwriter reappraise the policy.

Pros and cons of business interruption (use and occupancy) insurance were also discussed. It was the consensus of opinion that this type of insurance is very valuable, particularly for companies operating only one or two plants. One multiple plant operator thought that having good night watchmen (with time clocks) supplanted the need for this type of insurance; also with multiple plants, accidental production loss at any one plant could be compensated for by other production units.

One producer requested the association consider making a survey on frequency of fires in the two industries. His plant was located beyond the fire protection district and consequently would have to carry exhorbitant fire insurance rates. The question was whether it was worth the gamble to go without fire insurance, in view of the fact that the plant was "fireproof."

One multiplant operator reported having the fire insurance portfolio overhauled, based upon a re-survey of physical plant 18 months ago. The findings led to a new blanket policy, which reduced the rates substantially and meant the company could enlarge its fire protection.

At the conclusion of the meeting, Mr. Kremer announced that the controllers conference would be continued at the next annual meeting.

ROCKY'S NOTES

(Continued from page 189)

characteristics of his product were impaired by installing new preliminary grinding units, even though his finished product was ground to the same Wagner surface area." Such information shows, of course, intimate contact with cement operators, and would not be found in ordinary text-books on concrete; and it is typical of the kind of material this book contains.

Pozzolanic Cements

Chapter 4 summarizes knowledge to date on pozzolans, in which one of our authors has a particular interest since he has examined concrete structures in Europe dating back to the days of the Roman Empire. After discussing the varieties of pozzolans and ways of determining pozzolanic activity, the authors state: "Although it remains to be proved, it would seem, in the light of the above comments, that acceptable pozzolans could be developed in almost any locality in the United States if sufficient effort was directed toward such objectives." It is obvious that the authors think well of portland-pozzolan cements.

We are especially interested in a reference to the Arrowrock and Elephant Butte dams of the Bureau of Reclamation, because we saw the Elephant Butte dam under construction, and because it is made of admittedly durable concrete. The cement was a 52 to 48 percent mixture of portland cement and a finely ground local sandstone; interground at the damsite. The authors say: "Tests have shown that the sandstone, although siliceous, has little or no pozzolanic activity. The sand was therefore little more than an adulterant, and the blending process a means of accomplishing finer grinding of the portland cement constituent. Nevertheless many advantages of a true pozzolan-portland cement concrete were obtained. Today, both dams are exceptionally watertight and in excellent condition except for some raveling on the downstream faces, which would now be avoided by use of richer face mixes." It is difficult for us to see how the "advantages" of a pozzolan-portland cement were obtained without pozzolanic activity; and we still believe, and will continue to believe, that with the particular cements used (probably high in alkalies) there was pozzolanic reaction, although it may have required years.

Other Cements

Chapter 5 is on "Other Hydraulic Cements," including what the A.S.T.M. defines as "blended cements"—additives at the concrete-mixing plant—

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and portland-slag cement. Under "Masonry Cements," we see for the first time in a medium for general reading, the admission that most of the masonry cements produced by portland cement manufacturers are interground mixtures of clinker and limestone. According to our authors this is done in three stages, because of the differences in grindability of the two ingredients: (1) Differential grinding of the clinker and limestone to 50-75 percent of their final finenesses; (2) accurate proportioning by means of weigh-type feeders; (3) final grinding to the prescribed mixture surface area.

Various other cements such as natural, aluminous, white, oil-well, etc., are touched on rather briefly. Then follows Chapter 6 on "Additions and Admixtures," which covers (a) Plasticizers; (b) accelerators and catalysts; (c) water-repelling agents; (d) agents to control expansion; (e) pozzolanic materials; (f) retarders. Perhaps the only one of these subjects which is unfamiliar is "expansion agents." The text describes these as powdered metallic aluminum and pulverized grey iron filings. which are used in special instances to prevent shrinkage.

Concrete Aggregates

About one-third of the book, comprising five chapters, is devoted to aggregates. The geology and petrography of aggregates is quite comprehensive and practical. We presume much of the material is based on Reclamation Bureau experience, since it has had a lot of it in the Western States. Slag aggregate is, of course, included, as well as the new lightweight aggregates. The effect of aggregate properties on concrete is discussed in a separate chapter, which includes both physical and chemical properties. The cement - alkali - aggregate reaction, of course, comes in for a full discussion. The chapter on "Prospecting, Exploration, Sampling and Testing of Aggregates" appears to be largely an adaptation from the Concrete Manual of the Bureau of Reclamation, and is thoroughly practical and useful. The final chapter on "Processing Concrete Aggregates" is rather skimpy, compared to the space devoted to the manufacture of cement.

In conclusion, there is one point the reviewer would like to make. It is this. We wish authors of textbooks which are undoubtedly of permanent value, and will stay in print for at least several years, would desist from using such terms as the "latest data," or "recent information," or the "newest" thing or idea. In an industry changing as rapidly as is cement and concrete, such statements, opinions, etc., should be dated rather than described as "recent," or "latest."

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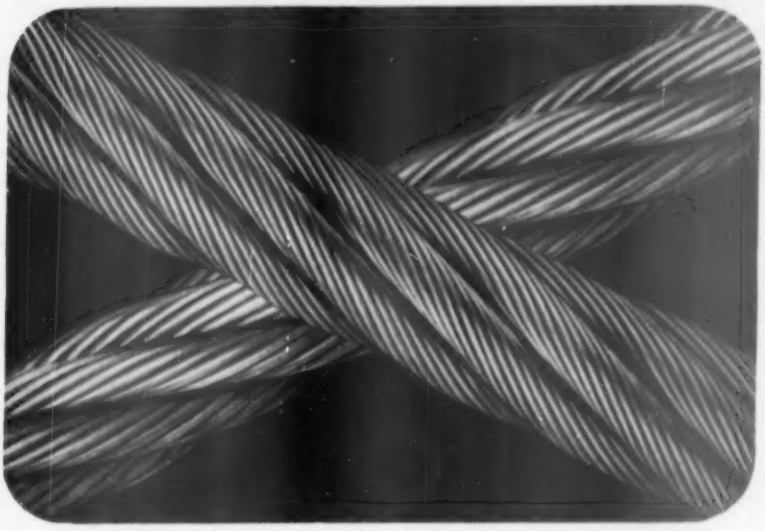

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LABOR RELATIONS

(Continued from page 23)

"The Board, in its brief, concedes, as it must, the basic principle that an employer who locks out its employes on mere threat of, or in anticipation of, a strike is guilty of an unfair labor practice. Up to the time of the decision in the instant case, the Board has held that only in unusual cases of economic hardship is an employer justified in locking out its employes when faced with a threatened strike. Thus, it has held that an employer may close down operations where (1) a spoilage of materials would otherwise result; (2) the prospective work stoppage in one of several integrated departments threaten to be of a recurrent nature so that it is difficult for the employer to plan production; or (3) the union's refusal to give assurance of sufficient advance notice to allow repair work in progress to be finished and returned to customers, renders it economically imprudent for the employer to continue operations.

"The Board also concedes in its brief that, 'prior to this case, a majority of the Board had interpreted the Act as precluding the non-struck members of an employer unit from utilizing a lockout.' In the instant case, the Board departed from its previous position by adopting the position of the Ninth Circuit in Leonard v. N.L.R.B., 197 F. 2d 435.

"The Ninth Circuit reasoned that its decision was necessary because a strike against any one member of an association would find that member too weak economically to stand up under a strike. We seriously doubt whether mere proof of such weakness of an employer, when threatened with a strike, justifies him in utilizing a lockout. But we need not here consider that question. For there is no proof here, and no finding, that any of the employers who locked out was thus economically weak. On the contrary, according to the stipulated facts, the sole reason for the lockouts was the strike against a single member of the association and a desire to end that strike.

"The Ninth Circuit regarded as significant the linking of the term 'strike and lockout' in the statute, and on that basis concluded that Congress recognizes the two as correlative economic powers. But we think the Board correctly noted that, in each instance where those two words are linked, a particular strike activity is proscribed as unlawful, and the specific inclusion of 'lockout' in this context may well have stemmed 'from a desire to emphasize even-handed justice where union activity was being restricted.' We think the Board in that case was also correct in saying: 'We find nothing in the Act which equates lawful strikes and lockouts. On the contrary, only the right to strike is expressly reserved by Congress in Section 13 of the Act. The absence of any similar expressed reservation of the right to lockout strongly argues against any intent to establish that right.'

Theory of Board

"The Board, although relying on the decision of the Ninth Circuit, goes somewhat further in its reasoning. It seeks to support its new ruling in various ways: (1) Although the threat of a strike involved no peculiar economic hardship to any of the employers not on strike, nevertheless the case comes within the exceptional economic hardship category because the strike against Frontier involved the 'destruction of the unitary system of bargaining.' (2) Because of the previous bargaining with exchange, a strike against one member was the equivalent of a strike against all.

"The Board's position, no matter how stated, thus comes to this: (1) A union cannot be compelled to bargain in the first instance with several independent employers solely through

(Continued on page 194)

around the world with Gruendler Crushers
Grinding LIMESTONE
at Ballybeg, Buttevant Quarry
CORK, IRELAND
One of Six Gruendler Installations producing Lime Dust for the agricultural economy of Ireland. Here thousands of acres of peat bog are being drained and rehabilitated with the application of Ag-Lime. A typical result: Increase in Sugar content of Beets of over 20%.
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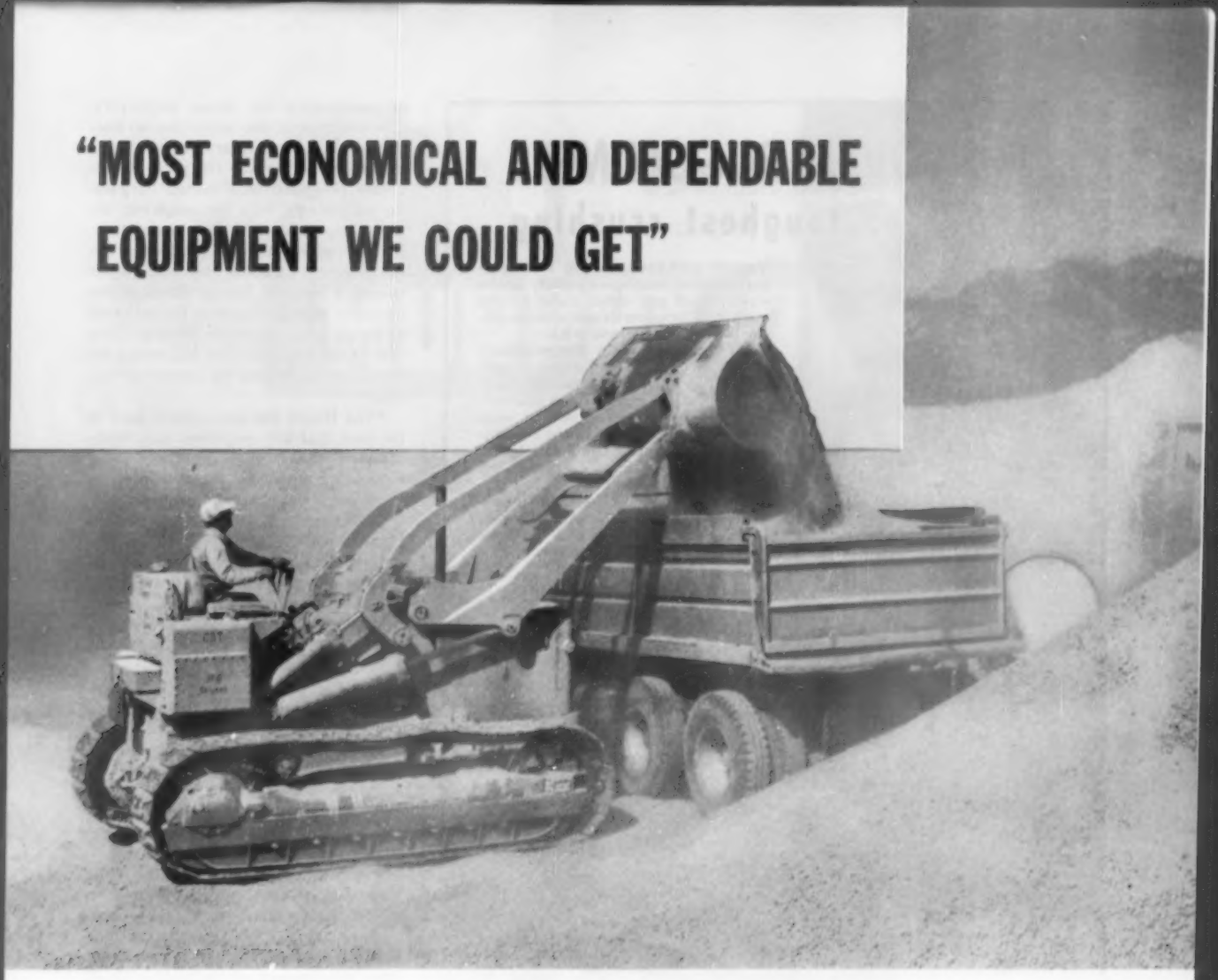

C. D. Stewart, a partner in Wells and Stewart Construction Co. of Las Vegas, Nev., thinks highly of his Caterpillar machines. "For our type of work," he says, "they are the most economical and durable equipment we could get. We find our machines very simple to operate, and we're most happy with them. Our dealer service is excellent, too." In addition to the No. 6 Traxcavator shown here loading gravel at their crushing plant, Wells and Stewart own two track-type and two rubber-tired tractors built by Caterpillar.

Now there is a successor to the No. 6. It is the new Caterpillar No. 977 Traxcavator*, with 100 HP CAT* Diesel Engine and 2¼-yd. bucket. It and the No. 955 (1½ yd., 70 HP) and the No. 933 (1 yd., 50 HP) comprise the new Caterpillar-built Traxcavator line.

These three new Traxcavators are designed from the ground up as excavating and loading machines. Weight, horsepower and bucket capacity are perfectly balanced for top efficiency and economy. All three have these advanced Caterpillar features: 40-degree bucket tip-back at ground level for more leverage, less spillage. High reach without strain, thanks to extra-strong box section arms. Long-lasting oil clutch, which seldom needs adjustment and stands up to rough duty in pit or quarry. Conveniently placed controls and "built-in" operator comfort.

There's a Caterpillar-built Traxcavator, with choice of buckets and attachments to increase versatility, that will cut costs on *your* operation. Ask your Caterpillar Dealer for an on-the-job demonstration today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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PROVEN RUGGEDNESS
for toughest crushing

Year in and year out you find more Farrel-Bacon crushers in really severe service than any other make on the market. When you examine these machines, you understand why.

The answer lies in the extremely simple mechanism and extra rugged construction of both frame and working parts. Also, Farrel-Bacon crushers, even after many years of the most abusive service, can always be brought back into first class condition, by rebabbitting, rebushing or truing up parts—at minimum cost.

Because they last so long, investment cost per year is exceptionally low.

Sizes: 60" x 48" to 10" x 7". Write for complete information or engineering assistance

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8A-7

New Economy in Screening of Lime, Ag-Lime and Silica Sand

Difficult screening of damp fines is now practically troublefree and most economical with the Model E Leahy® Screen equipped with FlexElex heating of the jacket.

No other heated screen offers the performance of such wide-open mesh, complete elimination of flexible connectors, such convenient and rapid changing of jackets without make or break of electrical connections and such operating economy.

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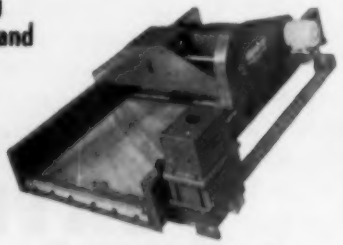

Made by the Original Deister Co.
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The DEISTER CONCENTRATOR COMPANY
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an association of those employers; (2) however, if the union has so bargained for several years, then, by this voluntary action on its part, it becomes obligated to continue bargaining exclusively with the employer association, at least to the extent that, if it strikes against one member of the association, lockouts by the other members become lawful although the lockouts would otherwise be unlawful as unfair labor practices. Such a ruling constitutes unauthorized legislation by the Board in which we cannot acquiesce.

"The Board has consistently held in the past that any employer may withdraw at will from a multi-employer bargaining unit, despite a history of multi-employer bargaining. Although it would seem only fair that the union be accorded the same privilege of voluntary withdrawal as is enjoyed by the employer, the Board has limited a union's right to withdraw from a multi-employer unit where there is such a history of multi-employer bargaining.

"We see no rational basis for holding in any context, that at any time any particular employer may, at his will, withdraw from bargaining through an employer's association of which he is a member, while a union is not equally free to discontinue bargaining through such an association with respect to any particular employer member. On that account, were the issue here that of the appropriate unit in which the union must bargain—concerning which the exercise of the Board's discretion is usually accorded great weight—we are inclined to think that the Board would 'abuse' its discretion in forcing a union to continue bargaining with a multi-employer unit against the union's wishes. In any event, we think that the union here met the test established by the Board in the Morand case, i.e., an impasse in the bargaining with the association had been reached before the union called a strike at Frontier.

Legality of Lockout

"The issue here, however, is not the appropriate unit for collective bargaining purposes, but whether a lawful strike against one member of exchange justified a lockout by the other members. There was no claim here that the union had refused to bargain; nor did the union seek certification as representative of a unit smaller than the association-wide unit as in the Stouffer case, supra. Consequently, here the Board had no occasion to exercise its discretion to determine the appropriate bargaining unit. Hence, we do not intrude on the exercise of the Board's discretionary power to make such a

550 more tons per day . . .
since they repowered with

MURPHY DIESEL

After this Murphy Diesel 198 H.P. altitude engine took over the job, the big rock-crushing plant above turned out 550 more tons per day than with any previous power. Operating in Colorado at a 7000-ft. elevation, the Murphy-powered plant is making extra profit for its owner.

• Profitable aggregate production depends on the power that drives your crushing plant. Take it from the owner of this Cedarapids Master Tandem who increased production *and profit* by repowering with a Murphy Diesel. Whether you're operating high in the Rockies, or deep in a quarry, take advantage of Murphy's greater fuel economy, longer trouble-free life, and dependability unmatched by any other engine of comparable size.

Ask producers who own Murphy Diesels to give you their opinion about the power that assures more profitable production from any plant—then ask your Murphy Diesel dealer to show you what a difference Murphy can make in your operations.

MURPHY DIESEL

HEAVY-DUTY POWER for Rock Crushing

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

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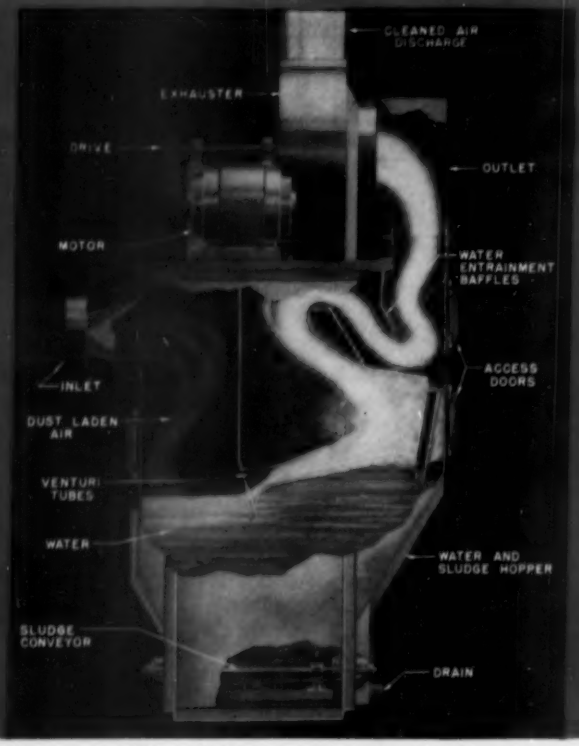
348-A

NEW PANGBORN VENTRIJET
Gives Efficient Wet Dust Control



Efficient wet dust collection depends on breaking water into particles and mixing it with the dust. The new Pangborn VENTRIJET Collector utilizes venturi tubes to achieve this effect. As dust-laden air enters the inlet chamber, heavier dust particles sink to the bottom. The air stream then passes through the venturi tubes at high velocity, drawing water with it and breaking it into minute particles. These particles mix thoroughly with the remaining dust in the air and give the VENTRIJET its high operating efficiency. In the outlet chamber, the resulting sludge settles to the bottom for removal. Eliminator sections remove water droplets in the washed air and the cleaned air is then discharged. The result is peak performance in a minimum of space.

Pangborn VENTRIJET offers these advantages:

- Complete, self-contained unit with low headroom, minimum floor space
- High air velocity through venturi tubes insures thorough mixing of air and water
- Venturi tube design results in minimum pressure loss and provides uniform flow—no narrow channels to become choked with sludge
- Tube design and thorough washing action enable collector to handle heavy loads.

For full details, write to PANGBORN CORPORATION, 4300 Pangborn Blvd., Hagerstown, Maryland.

Visit "Pangborn Institute" at AFS Show, Atlantic City, May 3—9

Pangborn CONTROLS DUST

determination when we hold that the union had a right to withdraw from the multi-employer unit by calling a strike against only one member of exchange, at least to the extent that the calling of that strike did not render the lockout lawful.

"The arguments against legalizing lockouts, merely because a multi-employer unit is involved, were set out by the Board itself in the Morand case.

Sanction of Congress

"Multi-employer bargaining has never received the express sanction of Congress. It would stretch the usual canons of interpretation unduly far to conclude that, in enacting the Taft-Hartley Act, Congress gave legislative approval to all the previous Board rulings concerning such bargaining. Even if we assume that it did, still the Board at that time had not gone to the extreme length to which it now seeks to go in order to maintain the 'stability of the employer unit.' We think Congress must have intended that such a radical innovation be left open for consideration by the joint committee it set up under §402 of the Act to study, among other things 'the methods and procedures for best carrying out the collective bargaining process, with special attention to the effect of industry-wide or regional bargaining upon the national economy.'

"We feel the Board's action in restricting employes in the exercise of rights which Congress has expressly protected, merely to effectuate a policy as to which Congress has, as yet, expressed no clear opinion, constitutes an abuse of the Board's legitimate authority under the Act and a usurpation of the power of Congress. Neither the Board nor the courts may make so fundamental a change in the existing law as that which would result from the Board's decision. The problems involved in legalizing the lockout in multi-employer situations are manifold, and their solution must be left to Congress.

"Since the stipulated facts show no economic justification for the lockout, we hold that the lockout of non-striking employes constituted an interference with their statuatory right to engage in concerted activity in violation of §8(a)(1) of the Act, and also constituted discrimination in the hire and tenure of employment of the employes because of the union's action, thereby discouraging memberships in the union in violation of §8(a)(3) of the Act.

"The Board's order and decision dismissing the complaint must be set aside. The case is remanded to the

(Continued on page 198)

Rock drilling is a one-man operation with the Schramm Truck Mounted Rotadrill. To put the Rotadrill to work, operator needs only lower outriggers, raise mast and attach drill pipe and bit.

Oversize truck engine (450 cu. in.) drives 4½" x 4¾" x 6 cylinder Schramm Compressor through power take-off. Compressor delivers 320 c.f.m. at 40 p.s.i., can be instantly increased to 200 p.s.i. for dewatering and breaking out blockages.

Heavy welded structural steel mast, raised and lowered hydraulically, is carried on crotch between jobs.

Drilling controls are located adjacent to mast for one man operation. Individual valves control each outrigger, rotation of motor, fast and slow vertical feed and breakout cylinder.

IN QUARRY AFTER QUARRY:

Rotary air drilling proves fastest of all

It's an established fact that quarrymen drill rock faster and easier when the new Schramm Truck Mounted Rotadrill is on the job. Actual field reports prove that Schramm units using compressed air set new records in almost every case—making hole 600% to 700% faster than conventional drilling techniques.

Mobility of the drilling unit is a further advantage to quarrymen. Fast set-up is another. And prolonged bit life is a third. These are added reasons why, in quarry after quarry, Schramm Truck Mounted Rotadrills are replacing conventional wagon drills.

Rotary air drilling is accomplished through a reversible hydraulic motor-driven rotation head, mounted on a carriage that rides tracks mounted on the mast. Hydraulic drive provides rapid travel and slow speed, with maximum down-pressure or lifting ability of 20,000 pounds. A Schramm air compressor, driven from the truck engine through a power take-off, delivers 320 c.f.m. of air at 40 p.s.i.

Complete details of the SCHRAMM TRUCK MOUNTED ROTADRILL are described in Bulletin TMR-55. It's yours for the asking. If you are not familiar with the rotary air drilling technique, ask for our bulletin, "Rotary Rock Drilling with Schramm Air Compressors." Although prepared for the petroleum field, this booklet is packed with information of interest to anyone who owns a drill rig.

Your local Schramm Dealer is listed in the Yellow Pages of your telephone directory.

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FOR PROFITABLE SCREENING
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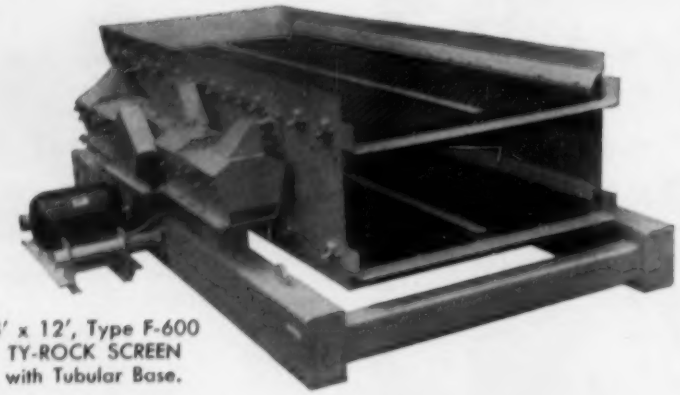

5' x 12', Type F-600
TY-ROCK SCREEN
with Tubular Base.

TYLER VIBRATING SCREENS
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TYLER WOVEN WIRE SCREENS

There is a Tyler Vibrating Screen for every sizing and dewatering job. Tyler Screens are noted for the huge tonnages handled with top efficiency and low cost per ton.

Tyler Woven Wire Screens are made in all meshes and metals in over 10,000 different specifications. Ton-Cap and Ty-Rod Screens with the long-slot openings provide the greatest capacity for a given discharge area.

THE W. S. TYLER COMPANY
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CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

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Skilled crews and complete stock of core drills and accessory equipment maintained at all times

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ROCK
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ISSUE

LABOR RELATIONS

(Continued from page 196)

Board for further proceedings in conformity with this opinion."

Dissenting Opinion

Waterman, Circuit Judge (dissenting):—The National Labor Relations Board decided in this case that the employer members of this multi-employer bargaining unit did not violate the National Labor Relations Act, 29 U.S.C.A. §151 et seq., by locking out their employes when the union, following several weeks of unsuccessful contract negotiations with the group, engaged in a strike against one of the members in support of its demands against all. The Board concluded that the strike against one member 'necessarily carried with it an implicit threat of future strike action against any or all of the other members [of the multi-employer bargaining unit.] In these circumstances and in the absence of any independent evidence of anti-union motivation, the Board viewed the lockout as 'defensive and privileged in nature, rather than retaliatory and unlawful' since it was a necessary means of protecting 'the employer solidarity which is the fundamental aim of the multi-employer bargaining relationship.'

"I think that the decision of the Board, which accords with the views of the three Courts of Appeals that have thus far had occasion to consider the problem, is a reasonable and proper construction of the Act. For the reasons set forth below, I would affirm the Board's order dismissing the union's complaint.

Concerted Activity

"1. *Not every employer interference with a legitimate concerted activity is proscribed by the Act.* Thus, an employer is permitted to replace economic strikers, even though this amounts to a limitation on free exercise of the right to strike. Similarly, where special 'economic or operative' problems are presented, an employer may counter a strike threat with an anticipatory lockout.

"2. *The employers in a multi-employer bargaining unit have a legitimate and vital interest in the continuance of the established unitary system of bargaining.* In this case the eight members of the exchange are linen supply businesses competing with each other within the Buffalo metropolitan area, and the union represents the drivers of all exchange members. The joinder of the employers for purposes of bargaining as a unit with the union in such circumstances presents a familiar pattern in industrial relations.

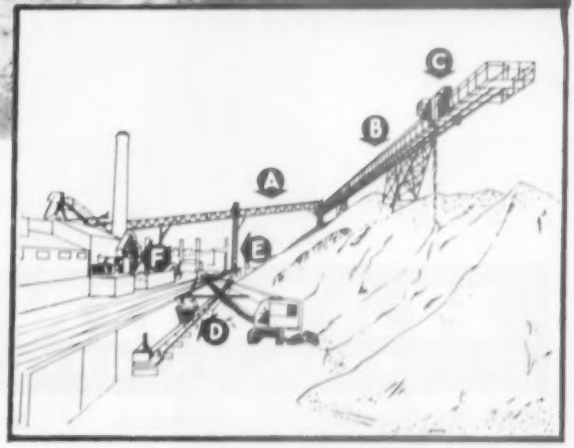
(Continued on page 200)

Another Example of Continental's Belt Conveyors at Work -

The Southern Cement Company's conveying and elevating system in their Birmingham Plant incorporates several advanced features of design—one of which is illustrated above and to the right.

Continental's engineers are skilled in "practical engineering" — the kind that results in installations designed for economical, dependable operation and long life. All Continental products — whether especially designed systems and equipment or standard equipment and accessories — show the value of practical engineering.

• *Call Continental engineers in on your job — or specify Continental on your next replacement order.*



Slag is carried to storage by Conveyors A and B and discharged to storage at any point by self-propelled Tripper, C. As material is needed for processing, it is loaded by shovel onto Reclaim Conveyor D, raised by Bucket Elevator E, and discharged onto return side of Conveyor Belt A., which delivers it to Plant F.

Write for your copy of Continental's new Catalog ID 481, "Continental Belt Conveyors."

CG 4995

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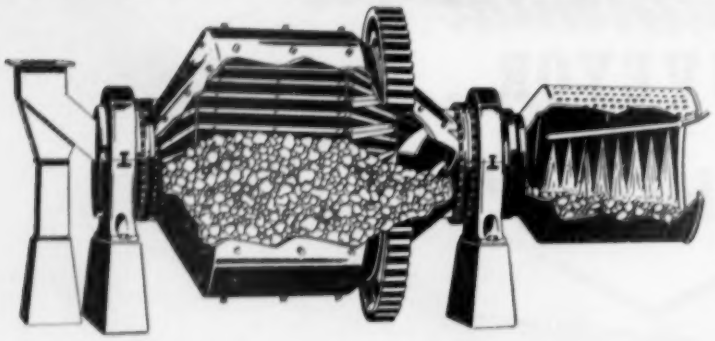
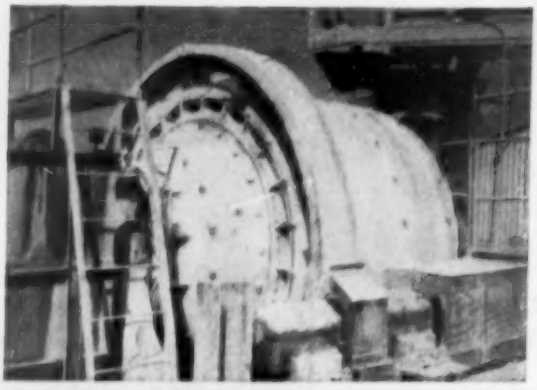
HARDINGE SCRUBBERS FOR PIT-RUN MATERIALS



Large diameter, short length trunnions permit chute feeding of unsized ore and rock at rates up to 600 tons per hour.
The mass loading and ball-mill action in the scrubber quickly and completely slurries the clay and dirt, permitting ready separation on washing screens or trommels.



View of a 10' x 66" Hardinge Scrubber cleaning crushed dolomite in a California plant.

BULLETIN 37-A-7

HARDINGE
COMPANY, INCORPORATED

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WOVEN WIRE SCREENS
ACCURATE • DURABLE • ECONOMICAL
The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings — from 10 mesh, .035" wire on up. Write today for Catalog No. 53.
TWIN CITY IRON & WIRE CO.
35 W. WATER STREET • ST. PAUL 1, MINNESOTA

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

LABOR RELATIONS

(Continued from page 198)

It allows small employers to bargain on an equal basis with a powerful, industry-wide union, and at the same time avoids the competitive disadvantages resulting from non-uniform contractual terms.

"3. *The Board's accommodation of the legitimate interest of the employers in group bargaining and the right of the employees to strike in support of their demands is a reasonable and proper one.* Group bargaining benefits the union and the public as well as the employer. The union minimizes its organizational and administrative expenses; it can more readily standardize wages and other conditions of employment; and it gains security against raiding by other labor organizations. Moreover, insofar as the public is concerned, the experience of the Board and many other specialists in the labor field has shown that strikes within these units tend to be infrequent, and that there is more likely to be full acceptance on both sides of the principle of resolving differences through negotiation. In my judgment the decision from which I am dissenting would tend to undermine these beneficent developments and to convert industrial relations into a pattern of continuous piecemeal strife.

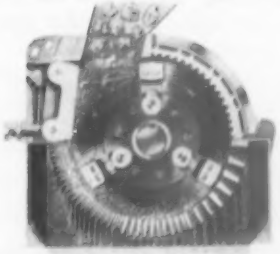
"The Board argues that the purposes of multi-employer bargaining are to create uniform terms and conditions of employment at the plants of all employers in the unit, and to achieve on a case-by-case basis an approximate balance of power between organized labor and organized management. From the employers' point of view, the Board says, the major advantage of multi-employer bargaining is that it may give the employers sufficient bargaining power to withstand the divisive pressures of whipsawing. When a union representing all of the employes of a multi-employer group engages in a strike against one of the members of the group, even while pretending to bargain with the group as a whole, it is directly attacking an important interest of all the employers in the group—their interest in group bargaining. The Board feels that the multi-employer bargaining unit will not long survive if the non-struck members are not permitted under such circumstances to use their countervailing force against the union. I think we should accept the experienced judgment of the Board on such matters. The present decision will tend to destroy the equality of bargaining power and reduce incidence of strikes

(Continued on page 204)

with a Cedarapids Built by IOWA UNITIZED PLANT

This Cedarapids Unitized Plant, with a 4033 Hammermill Secondary in key position, maintains a 250 ton per hour production pace for a total annual output of approximately 38,000 tons of aglime and 112,000 tons of crushed limestone. When 3 or 4 sizes of finished product are required simultaneously, a Cedarapids Portable Screening unit is used as shown above.

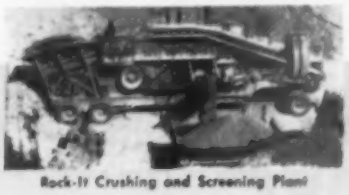
For producing aglime or crushed limestone, or both, in one operation, you can't beat the high product quality, big capacity and low-cost operation of Cedarapids Hammermills. You can have them in complete portable crushing and screening plants, as individual units, or in stationary plants, in 4033, 3033 and 2033 sizes. See your Cedarapids distributor today for details.



CEDARAPIDS HAMMERMILLS FOR HIGHER QUALITY AG-LIME

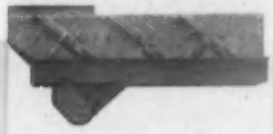
A revolutionary operating principle combines an impact breaking and milling action which results in the uniform, fine agricultural limestone that assures repeat orders. And size for size, Cedarapids Hammermills turn out more tons per hour than other similar types of equipment

IOWA MANUFACTURING COMPANY . . Cedar Rapids, Iowa, U.S.A.

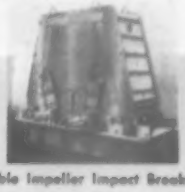


Rock-It Crushing and Screening Plant

Cedarapids Hammermill



Horizontal Vibrating Ag-Screen



Double Impeller Impact Breaker

CUT CALCINING COST!

Four-Unit Installation at Vancouver, British Columbia

Calciner

CUT LABOR COST — The Ellernan Calciner's AUTOMATIC continous operation requires a minimum of labor.

CUT FUEL COST — Recirculation of heat ordinarily lost and automatic temperature control cut fuel costs by more than 30 percent.

CUT ORIGINAL COST — The new, compact Ellernan Calciner costs LESS THAN HALF the price of ordinary calcining installations.

Ellernan Calciners treat small - size LIMESTONE, DOLOMITE, PHOSPHATE, GYPSUM, CLAY, etc. The unit preheats, calcines and cools automatically and continuously with exact temperature control. Completely flexible . . . Ellernan Calciner installations are adaptable to any size plant, to handle any capacity.

Write or wire for full details to

THE ELLERNAN COMPANY

1210 Continental Bank Bldg.
Salt Lake City, Utah

Serving the Industry Throughout the World

Panel On A.C.P.

(Continued from page 162)

and regulations in the different states are confusing, the rules being too specific when backed with so little knowledge. A producer asked when a test shows the need for six tons of agstone, why only two tons are permitted. The answer was that funds are limited. Another question was why a producer might not be permitted to serve on a State Planning Committee in order to help in the overall planning.

Conservation Needs

AN EXCELLENT LUNCHEON ADDRESS, "Conservation — A National Need" by Assistant Secretary of Agriculture Ervin L. Peterson was optimistic for the future of A.C.P. and the industry.

Mr. Peterson stressed the importance of the profit system and the business approach to agriculture, throughout his talk. He said that the way land resources are managed will determine in the years ahead the nature of the problems to be faced.

He considers conservation as the wise and intelligent use of these resources and stressed how the land resources are the foundation of our national economy. He is mindful of the fact that soil utilization is a business enterprise and that conservation practices must be complimentary to and in assistance to the business objectives of landowners and operators. Thus conservation is the responsibility of landowners and operators.

Immediate economics and conservation objectives, may not be compatible, he said, so a public responsibility for implementation of conservation practices for the objective of permanency of productive practices must be recognized. The immediate responsibility falls upon the landowner and operator, and, in the public interest, the responsibility is shared by all the people for the future.

The A.C.P. resulted from this objective, whereby the government shares with landowners the costs of performing certain conservation objectives for both immediate and long-time effects. A.C.P. is an incentive to getting more conservation than possible if farmers were to depend entirely on their own resources.

The process whereby the farmer contributes the labor and equipment plus part of the cost was referred to as a democratic process. Mr. Peterson emphasized that A.C.P. is not a handout or a subsidy and not a program for making large payments to the farmers. It is, rather the means of getting farmers started in conservation farming, and cost-sharing of participating farmers has averaged a little over $100 per year per farmer in the last year.

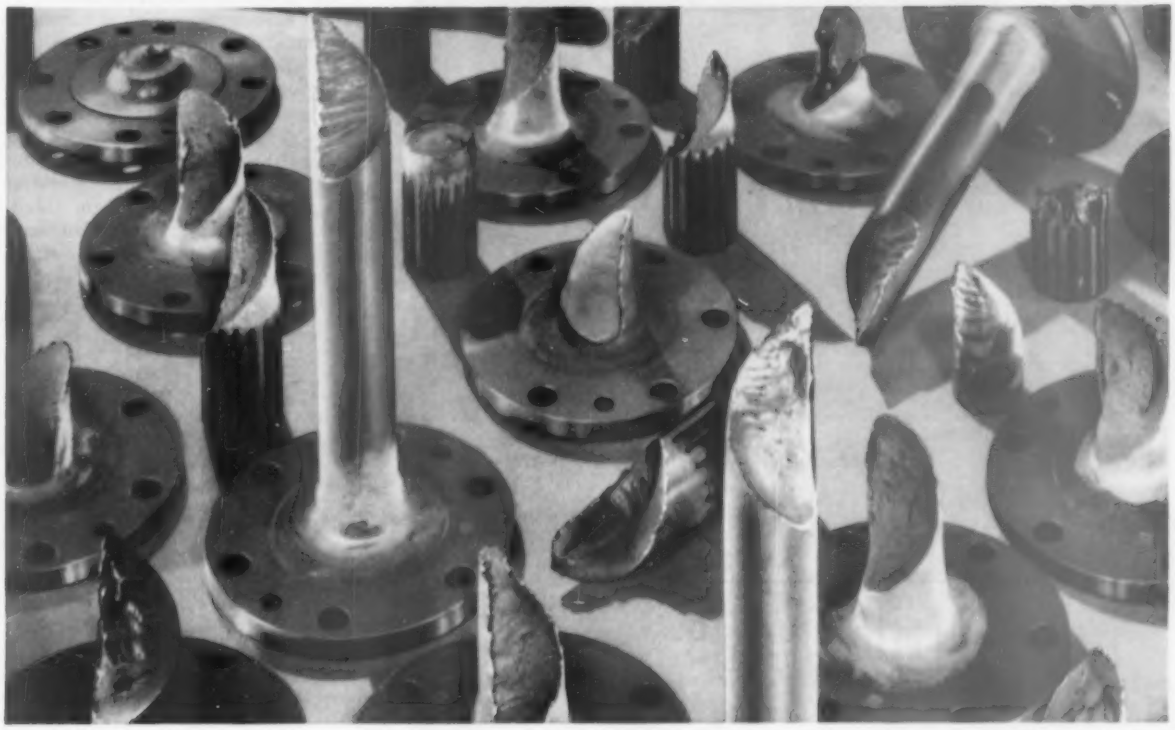
Touching upon the soil bank proposal now before Congress, he said that the conservation reserve side of the idea, which will bank in the soil fertility for the future, is not incompatible with the present A.C.P. program. The practices necessary to establish the grassland coverage are and will be determined by A.C.P., with administrative and operational procedures handled by State and county A.S.C. committees.

Thus, he believes the A.C.P. program, as the years progress, will become a larger program as more farmers understand the necessity of conservation and that more net income will follow. Mr. Peterson is optimistic that there will be a place for A.C.P. on a continuing basis larger than now.

•

RIVERSIDE SAND & GRAVEL, INC., has been formed in Wausau, Wis., with an authorized capital stock of 1000 shares of common stock at par value of $100 per share. Incorporation papers were signed by Ewalt Kufahl, Wausau, Wis.

We broke these truck axles in the lab...



In the INTERNATIONAL Engineering Laboratory, axle shafts are tested by twisting them back and forth—hundreds of times—at stress points far beyond those of any normal truck operation. Axle shafts are approved for manufacture only when they withstand a prescribed high number of twists. Production line axle shafts must conform to the quality standards set up by this rigid test.

to save you the BIG money!

Pictured above is a group of once fine and costly INTERNATIONAL axle shafts that have been purposely twisted and broken. This is done to make sure your INTERNATIONAL rear axle will last longer and save you the BIG money—the over-the-years operation and maintenance money.

This rigorous axle-twist test is but one of many operations in the chain of INTERNATIONAL engineering that makes INTERNATIONALS *all-truck*. There are no passenger car compromises *anywhere* in INTERNATIONAL design, no passenger car engines or components asked to do a truck job.

And beyond this big plus of all-truck design, INTERNATIONAL gives you functional, practical, money-saving styling—extra comfortable driver-saving cabs—every modern driving feature.

If you use a truck to make money, see your INTERNATIONAL Dealer or Branch and start saving the BIG money!

There are trucks for every mining and quarry hauling job, in the world's most complete line. GVW ratings from 4,200 lbs. to 90,000 lbs.—conventional and COE, 4-wheel and 6-wheel, four-wheel-drive models—in thousands of variations for exact job specialization.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Motor Trucks • Crawler Tractors • Industrial Power
McCormick® Farm Equipment and Farmall® Tractors

The Perfect Sack for Your Purpose . . . Naturally!

Hammond Multi-Walls

- Constant, dependable supply due to completely integrated operation from forest trees to fine kraft Multi-Wall bags.
- Fast, reliable delivery assured by four strategically located plants:
  CHARLOTTE, N. C. • WELLSBURG, W. VA.
  PALATKA, FLA. • PINE BLUFF, ARK.
- Highest standards of quality assured by advanced research and control equipment.
- Speedy service from representatives in New York • Chicago • Minneapolis Kansas City • Cleveland • Baltimore Dallas • Charlotte, N. C. Ligonier, Pa. • Bluefield, Va.

"TREES ARE A CROP"

HAMMOND BAG & PAPER COMPANY, INC.

Division of Hudson Pulp & Paper Corp.

General Offices: Wellsburg, W. Va.

LABOR RELATIONS

(Continued from page 200)

which have been the hallmarks of multi-employer bargaining.

"Moreover, I agree with the Board that the decision of the Court will permit the union to keep the benefits which it has derived from multi-employer bargaining, while at the same time nullifying the consideration that made such unit desirable from the employers' standpoint. That is to say that both sides gain certain benefits and accept certain restrictions when they agree to engage in multi-employer bargaining. The union gains important organizational, raiding and standardization advantages, while the employers gain a protection against whipsawing. This decision would deprive employers of this *quid pro quo*. The union is enabled to strike the employers one at a time without running the deterrent risks of a unit-wide strike. In this situation, 'the right of the employers to lock out temporarily all the employes is no more than equal to the right of the union of all the employes to call out the employes of one after another of the employers in the whipsawing manner above described.

"4. *There is nothing in the Act or in its legislative history which deprives the Board of power to adjust the conflicting but legitimate interests of employers and employes in this situation.* The Act protects the rights of employes to strike in support of their demands, but this protection is not absolute. It is well settled that employers are not guilty of unfair labor practices when they act in protection of legitimate and vital interests of their own, even though such acts necessarily impinge on the concerted activity of employes. The Act is not a detailed blueprint, but a general guide; and it is the function of the Board to adjust the conflicting interests of employers and employes.

"Multi-employer bargaining is al-

(Continued on page 206)

This "No Contact" feature

REDUCES UP KEEP

$ $ $

SAVES YOU MONEY

In a Hayward, there's no contact between the closing mechanism and the material handled. This means much less wear, reduced upkeep, big savings in bucket maintenance. THE HAYWARD COMPANY, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

Have You Seen the AGIPELLER* ?

NEW!

INCREASES OUTPUT!

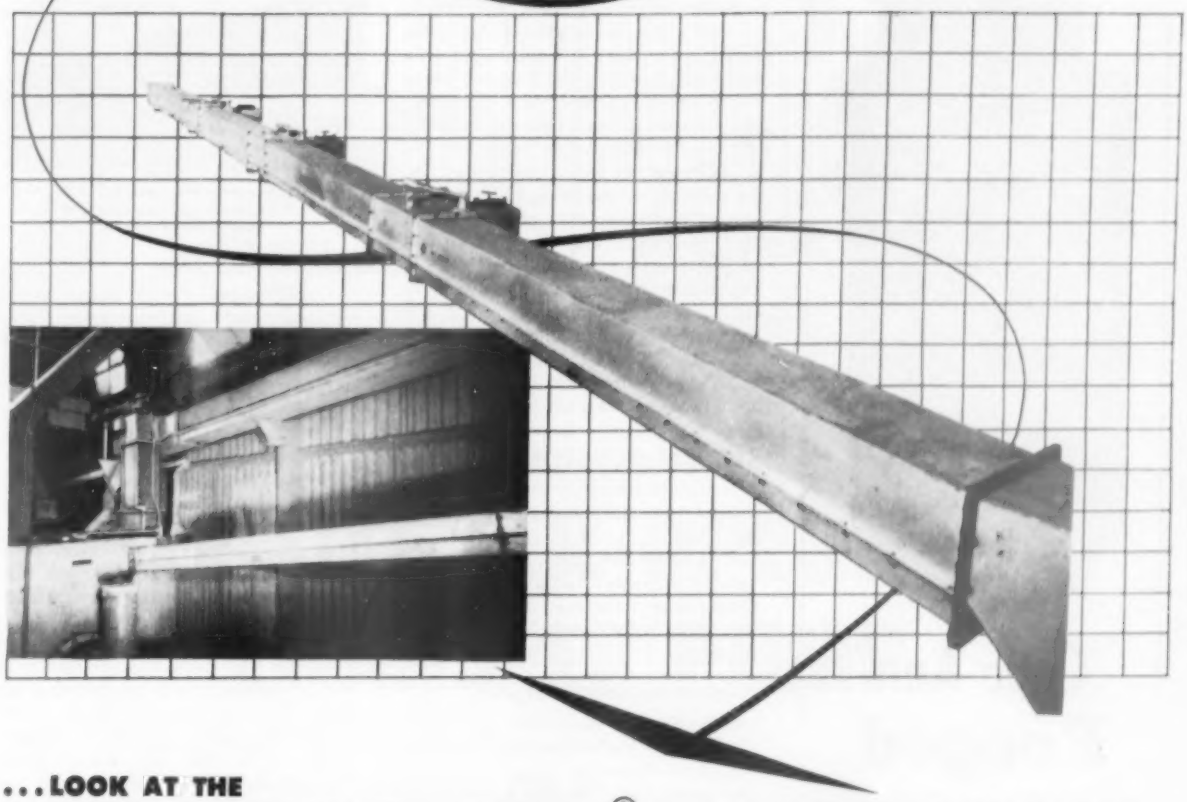
CUTS COSTS!

THIS SUCTION DREDGE AGITATOR (Pat. Pend.) keeps nozzle clean, loosens compacted deposits, crushes oversized stones. Pays for itself quickly. Write for free bulletin. *Trade mark

W. H. PFARRER CO., 211A W. Wacker Dr., Chicago, Ill.

Dredge and Pump Engineers

HOW TO SHY AWAY FROM HIGH CONVEYING COSTS



. . . LOOK AT THE

F-H AIRSLIDE® CONVEYOR

AND ITS RECORD OF SUCCESS

The simplicity and noiseless ease with which the F-H Airslide fluidizing conveyor conveys alumina, phosphate, cement, flour, filler dust, and many other dry, fine materials are being enjoyed in a great number of plants in many industries.

The Airslide's record for low maintenance, high-volume conveying is outstanding wherever it is used . . . benefits in operation and in maintenance are constant and substantial.

In operation, low-pressure air is introduced into the material, through a porous fabric, from a lower section, causing the material to literally flow in a fluidized state through the upper section of the Airslide, installed on an incline, the degree of slope depending upon the material to be conveyed.

The Airslide can be used singly or in combination with other Fuller air-conveying systems, such as the Airveyor® or Fuller-Kinyon system.

If your operation involves the conveying of dry, fine material, take the simple step of consulting Fuller. Fuller engineers can show you, as they have others, how the F-H Airslide can "carry the load" in a way you never thought possible. For details of the Airslide write us for descriptive literature.

FULLER COMPANY 102 Bridge St., Catasauqua, Pa.

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. . . . pioneers in harnessing AIR

More Tonnage

"Cape Ann"
Forged
Steel Drop Ball

Ruggedly designed and drop tested to insure maximum breakage. Lifting link protected by deep recess to minimize cable replacement. Adaptable for swivel or shackle.

Used by leading quarries for *economical secondary breakage.*

2000 to 12000 lbs.

Prompt Shipments

For further information write—

Cape Ann Anchor & Forge Co.
Post Office Box 360
Gloucester, Mass.

most as old as the Act itself. The Board has established many multi-employer bargaining units pursuant to 29 U.S.C.A. §159(b), and, when established, employers and unions have the reciprocal duty to bargain in that group 29 U.S.C.A. §158(a)(5) and (b)(3). Efforts to limit or destroy multi-employer bargaining were made in 1947, but the amended Act (the Taft-Hartley Act) left multi-employer bargaining undisturbed. I do not think it is properly inferable that Congress, by its inaction, meant to leave the question of multi-employer bargaining to be dealt with in future legislation. On the contrary, considering the long history of multi-employer units, it seems more reasonable that Congress intended that the Board should continue its established administrative practice of certifying multi-employer units, and intended to leave to the Board's specialized judgment the inevitable questions concerning multi-employer bargaining bound to arise in the future."

STOCKBRIDGE STONE

(Continued from page 94)

stone is currently being processed in the main plant but this material may later be sent to a separate section involving a scrubber and scrubber screen. Clean stone from this section will be then sent to screening and washing tower No. 1.

Finished Material Stockpiles

The finished materials are stockpiled over a reclaiming belt conveyor tunnel that is 480-ft. long. Seven sizes are stocked in a straight line with six of the sizes being in cone-shaped open piles. The 2½-in. to $\frac{3}{16}$ in. fluxstone is stored in a concrete stave silo that holds 400 tons of material. The minus $\frac{3}{16}$-in. washed sand is stored in a pile off-set from the main piles. It has a tunnel below and a reclaiming belt conveyor. This belt operates at right angles to the main belt and unloads to it. The finished piles all hold 5000 total tons each. Under the main piles are a total of six Jeffrey-Traylor vibrating feeders. The sizes not served by vibrating feeders are the minus $\frac{3}{16}$ in. and the smaller sized fluxstone. Materials that tend to flood have a chain curtain hanging in front of the

SCREENS

Screen	H.P.	R.P.M.	Voltage
5 x 14-ft. D.D. Robins Gyrex	10	1800	440
4 x 12-ft. D.D. A. C. Ripiflo	7½	1800	440
5 x 14-ft. D.D. Telsmith Vibro-King	15	1800	440
5 x 12-ft. D.D. Telsmith Vibro-King	15	1800	440
4 x 12-ft. D.D. Telsmith Pulsators	15	1800	440
6 x 16-ft. T.D. Robins Gyrex	15	1800	440

CRUSHER

42 x 48-in. Telsmith Jaw	200	600	2300
5½ ft. Symons Standard	200	600	2300
5½ ft. Symons Short Head	200	600	2300

Specially constructed quarry drill with compressor and engine mounted on frame over crawler treads

feeder. In addition there is a swinging steel baffle, and as the stone leaves the feeder some impinges against this baffle. This actuates a signal in the tower so that the operator knows stone is flowing properly. Blends of stone can be obtained on this belt should specifications require it.

The reclaiming tunnel belt conveyor delivers to a long inclined belt, operating at right angles to the reclaiming belt, which sends stone to a 6- x 16-ft., Type 11, Robins - Gyrex three - deck rinsing, and/or re-sizing screen that is mounted on top of the steel carloading tipple. It has 3-in., ¾-in., and $\frac{3}{16}$-in. mesh decks. The coarsest material from the top deck can go direct to the cars below or join the intermediate sizes. The intermediate sizes, if for car-loading, go to a 10-ton capacity holding bin over the track. Fines through the lower deck flow to the de-watering system. Commercial sizes of stone, after rinsing, can go to four steel truck loading bins across the track from the rinsing tower.

Above the loading tipple are three parallel tracks for storage of empties. Empties can move under the tipple by gravity and loaded cars also move by gravity although a car puller is available. Loaded cars can be weighed on

(Continued on page 208)

Left to right: Buster Parker, plant superintendent, and C. Blackstone, safety engineer

EASY WAY TO PUT OUTPUT ON THE UPSWING!

shift lubrication methods from

Backward to Forward!

ALEMITE AIR-OPERATED TRANSFER PUMP

gives 63% faster lubricant transfer

...saves right down the line!

The *real* cost of plant lubrication is not just the *lubricant* alone! Actually, it's the time and labor needed to get the lubricant *out* of the original drum—*into* a bucket pump or powergun—and then *applying* it to machine bearings. That's where the real costs add up!

And that's why an Alemite Air-Operated Transfer Pump can cut costs in your plant—especially if you are using old-fashioned hand methods of lubrication. It transfers 37 pounds of pressure gun grease *per minute*—direct from the original drum—completely sealing the lubricant at all times—protecting against mess, waste and contamination.

It's fast—and versatile! It can even handle alcohol, cutting oils, kerosene—almost any non-corrosive non-abrasive fluid you use by the drum. Delivers light fluids at a rate of up to 15 gallons per minute!

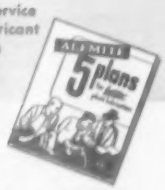
There's no better way to speed up your handling of lubricants—because an Alemite Transfer Pump pays for itself by saving man-hours and machine-hours as well!

• A 400-pound barrel of lubricant arrives at the plant—sealed, fresh, "refinery clean."

• An Alemite Transfer Pump is inserted in the bung-hole. It is threaded to fit—completely reseals the barrel.

• In less than a minute a 25-pound bucket pump is filled! No contamination, no air pockets, no mess or waste!

• Now the bucket pump is ready to service hundreds of hungry bearings with lubricant that is protected all the way from barrel to bearing!



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"5 Plans for Better Lubrication"
Alemite, Dept. EE-46, 1850 Diversey Pkwy. Chicago 14, Illinois
Please send me my FREE copy of "5 Plans for Better Lubrication."

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City ..... Zone ..... State .....

ALEMITE

Ask anyone in industry

A PRODUCT OF SW STEWART-WARNER

75-ton capacity standard lever, two-section Howe track scales with the weight bridge arranged for dead-rail operation. Thus, cars can by-pass the scales or be weighed. The scales are equipped with a Streeter-Amet automatic weigh-beam recorder. The automatic recording units are on a lease basis which includes servicing. Truck materials are weighed on a separate pair of scales at the plant office.

Water for stone washing is pumped from a reservoir by 8-in. Gould centrifugal pumps. Tailings from the plant flow to one of two settling basins with the material flowing in one end and clear water out opposite end and into reservoir. In all, there are eight Gould pumps; two are 8-in.; two are 3-in.; and four are 2-in. Settling pond requirements and seepage in the tunnels account for several of the smaller pumps. In the quarry, portable gas-driven pumps are used at present.

Personnel

The Stockbridge Stone Co. is a partnership of the Birmingham Slag Co. and Lambert Bros. Inc., Knoxville, Tenn. C. W. Ireland is president of the company, and William C. Ireland, vice-president in charge of operations; C. E. Blackstone, safety engineer for all the Birmingham Slag Co. operations; and J. A. Carnathan, general superintendent of all operations for the company. Buster Parker is superintendent of the new operation. J. H. Pigford is chief engineer and Wm. E. Hinkle, plant engineer. Other officials include: S. C. Snow, quarry foreman; Radford Smith, night quarry foreman; Carl Morrow, plant foreman; and J. W. Martin, office manager at the plant.

MANUFACTURERS NEWS

Detroit Diesel Engine Division, General Motors Corp., Detroit, Mich., has announced the appointment of D. J. Clymer as advertising manager. He joined the technical publications department in 1943 and was later placed in charge of distributor sales management programs and national trade shows. He was also assistant to the advertising manager. Announcement has also been made of the appointment of Peninsular Diesel, Inc., Detroit, Mich., as distributor throughout the Michigan lower peninsula.

D. J. Clymer

Robertshaw-Fulton Controls Co., Greensburg, Penn., has appointed David D. Gordon as sales manager of the Fulton sylphon division in California, Washington and Oregon. W. J. Hajek, former manager of the Los Angeles office, has been transferred to the Chicago office. M. R. Gilbert, Jr., has been named district manager of the heating controls division in the Chicago area. Two new sales offices have been opened by the Fielden instrument division, one in Englewood, N. J., with Austin Platt as eastern region sales supervisor, and the other in Chicago, headed by Robert Edsall, central region sales supervisor.

Gerlinger Carrier Co., Dallas, Ore., announces that N. Ernest Gresham has been appointed division sales manager for the northern half of the United States and all of Canada. George C. Lichty is division sales manager for the southern half of the United States.

Clark Equipment Co., Buchanan, Mich., has announced formation of a new subsidiary, Clark Equipment International, C. A., Venezuela, to consolidate export facilities of its operating divisions throughout the world, with branch offices at Battle Creek and Benton Harbor, Mich.

American Air Filter Co., Inc., Louisville, Ky., announces the appointment of Robert J. Wright as staff engineer for the dust control department. He was formerly resident engineer for W. W. Sly Mfg. Co.

Heltzel Steel Form & Iron Co., Warren, Ohio, has announced plans for construction of a 27,000 sq. ft. expansion to its plant for the production of batching plants, steel forms and road machinery.

The Rust Engineering Co., Pittsburgh, Penn., announces the election of Henry C. Goodrich as vice-president in charge of sales and estimates for the Birmingham, Ala., office. He was formerly project manager.

The Yale & Towne Mfg. Co., Philadelphia, Penn., announces that Carl O. Hedner, sales executive for the past 33 years and sales manager of hoisting equipment since 1931, has been named assistant general sales manager of the materials handling division. L. W. Goldenson has been named manager of the San Francisco

FOR A *Superior* AGRICULTURAL LIMESTONE PRODUCT

BRADLEY HERCULES MILLS

From rough to finish . . .
in one low-cost operation

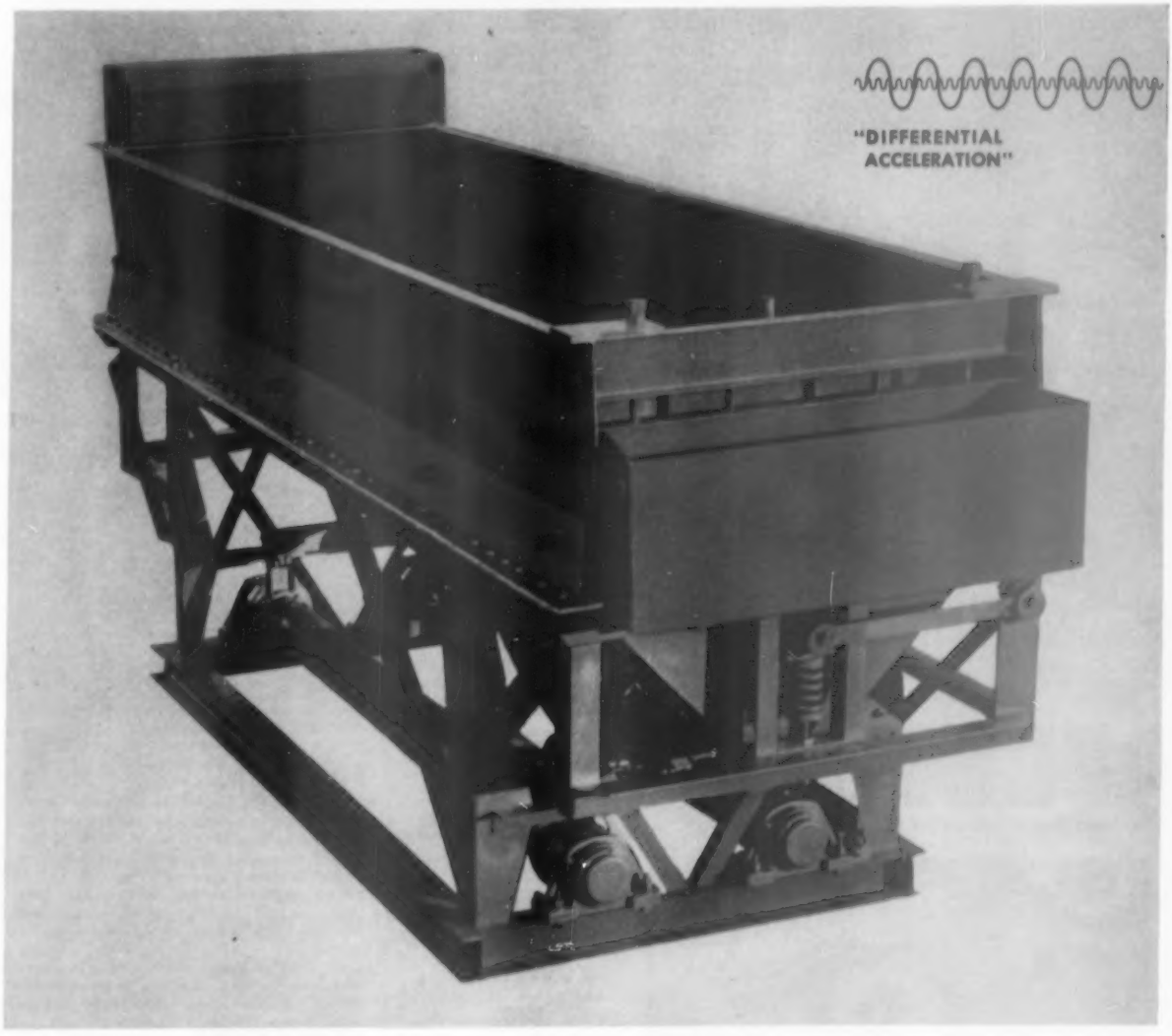
Constant progress in design and manufacture over the past 50 years has made Bradley Hercules Mills the standard pulverizer where a superior agricultural limestone product is desired. Automatic electrical feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum. In sizes to meet the requirements of most any plant at moderate cost.

For complete information, write for Catalog No. 61

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

WEMCO INTRODUCES THE REMER JIG



a new tool for sand and gravel cleaning

At Eagle Sand & Gravel Company, Sioux Falls, South Dakota

60 TPH Jig feed contains 6.0 to 10.0% shale.
After Jigging, sand contains only 0.3 to 0.5% shale.*
*(Further elimination can be made with the Remer Jig, but is not required in this specification.)

This gravel deposit also contains iron oxide with a yellow ochre center. The Wemco Remer Jig eliminates 70 to 80% of even this material.

Owner, Robert F. Bruns says, *"We are more than pleased with this phenomenal new machine and at last are able to meet the tighter material specifications."*

Differential Acceleration utilized on the Wemco Remer Jig combined with the long, wide bed, results in a fast moving, completely live jig bed over this large area. This long jig bed provides adequate hutching capacity that saves your fine sand yet eliminates undesirable materials. A typical 5' x 16' jig will clean 40 to 60 tons per hour. (Even larger tonnages have been reported.)

If your sand is contaminated by any material of lighter specific gravity, you need the facts on the Wemco Remer Jig. Write today for literature. (Other Wemco products for Sand and Gravel Treatment include Sand Preparation Machines, Sand Pumps and Wemco HMS Mobil-Mills.)

WEMCO
WESTERN MACHINERY COMPANY

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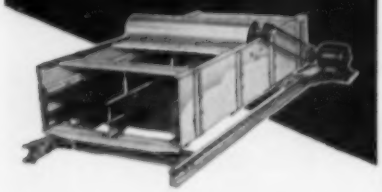
Representatives throughout the United States and Canada and in major countries around the world.

UNIVERSAL
OFFERS THE BEST
IN VIBRATING SCREENS
AT THE LOWEST PRICE



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There's a model to fit your particular requirement, priced within the smallest budget.

Write today for free catalog #150!

UNIVERSAL
VIBRATING
SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

sales and service branch of the division, replacing Harold N. Stiles who has been named acting electric truck sales manager in Philadelphia. J. Russell Manning, formerly Cincinnati branch manager, has been appointed manager of sales and service branch serving the Detroit and Lower Michigan Peninsula areas. He succeeds David Wirth who has been appointed national automotive account director for the company.

The Mine & Smelter Supply Co., Denver, Colo., has announced the appointment of Donald J. Drinkwater as assistant manager of the Marcy mill division. A graduate of the Colorado School of Mines with a degree of engineer of mining, Mr. Drinkwater was associated with U. S. Steel Corp. and the Ozark-Mahoning Mining Co. prior to joining Mine and Smelter as a metallurgical engineer in 1946. He is program chairman for the Colorado Minerals Beneficiation Division of the American Institute of Mining and Metallurgical Engineers and chairman of the Crushing and Grinding Section of A.I.M.E. for 1956.

Donald J. Drinkwater

Cummins Engine Co., Inc., Columbus, Ind., has announced the appointment of W. M. Steed as regional manager of the southwest region, which covers California, Arizona and Nevada, with headquarters in Los Angeles. He was formerly regional representative of the central region in Chicago.

Hyster Co., Portland, Ore., has announced the promotion of William P. Downey to supervising engineer of the straddle truck division, succeeding H. Noel Dimick, who has retired. Hugh Richmond has been promoted to the sales engineering department of the eastern industrial truck division at Danville, Ill. He was formerly with the engineering department in Portland, Ore.

The Master Builders Co., Cleveland, Ohio, division of American-Marietta Co., announces that Stephen W. Benedict has been elected vice-president of research and engineering. He succeeds Dr. Edward W. Scripture, Jr., who has retired after 25 years of service but will continue to serve in an advisory capacity. Formerly director of research, Mr. Benedict will be succeeded by Thomas M. Kelley, who has been on the research laboratory staff since 1954. Herbert K. Cook, also a member of the research laboratory staff, has been appointed director of engineering, and Perry H. Peterson has been named assistant director of engineering.

Stephen W. Benedict

Thomas M. Kelly

Mr. Benedict joined Master Builders as director of research in 1948. A graduate of the University of Illinois in civil engineering, he served as materials research engineer with the National Advisory Committee for Aeronautics, and was materials engineer in the cement and concreting materials section of the National Bureau of Standards. He is a member of the American Concrete Institute, American Society for Testing Materials, Highway Research Board and Cleveland Association of Research Directors.

Dr. Scripture has been with the company since 1930. He is well known for his research in the field of concrete and mortar, and has authored many published papers in this field.

Mr. Kelly, a graduate of Union College in civil engineering, joined the research laboratory in 1954. Previously he was masonry material research engineer in the National Bureau of Standards, and field construction engineer for the Corps of Engineers on the Detroit, McNary, Dorena Lookout and Dalles dams. In 1950, he was awarded the American Concrete Institute's Wason medal on concrete studies.

Mr. Cook became a member of the research laboratory in 1954. He was previously chief of the concrete division Waterways Experiment Station, Corps of Engineers, United States Army, Jackson, Miss. He is nationally known as a concrete research engineer and is author of technical papers on properties and methods of testing concrete.

Herbert K. Cook

Perry H. Petersen

Mr. Petersen, a graduate of Cooper Union Institute of Technology in civil engineering, was formerly with the U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif., where he was supervisory materials engineer, director of materials division, structures and research depart-

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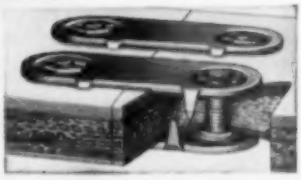
BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-112

FLEXIBLE STEEL LACING CO., 4684 Lexington St., Chicago 44, Ill.

EXTRA-TOUGH going calls for extra-tough AMSCO® DIPPERS...with Renewable Lip

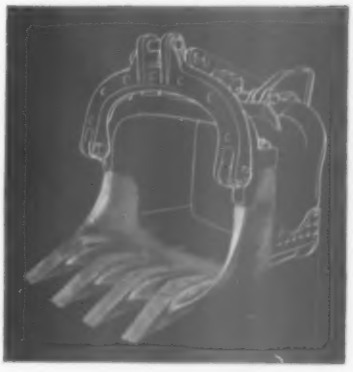
On the Iron Range and in the Copper Mines, demands on dippers are really tough. And that's where Amsco Manganese Steel Dippers have proved they can "take it"... in years of rough use.

Amsco *Renewable Lip* Dippers are particular favorites here. For when the lip eventually wears out, this easily changed unit cuts "repair-time" to *one-tenth* that required for change-over of conventional designs.

The lip sides overlap and fit snugly into sockets in the back casting. Lugs on lip fit into slots in front casting and are secured by forged, split keys. Sturdy U-bolts fasten lip to back casting, pulling it tightly to dipper when double nuts are screwed down. The result is one-piece rigidity and strength, free of play in any direction.

You save two ways: first, through the extra-long service life of Amsco Manganese Steel Dippers; second, through quick and easy replacement of the Renewable Lip.

See your shovel manufacturer for full information on Amsco Dippers, or write us direct.



AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

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CHECKLIST for EFFICIENT SCREENING OPERATION

	Yes	No
Is the screen you use tear-proof and warp-proof?	☐	☐
Does your screen last as long as you expect it to?	☐	☐
Is it easily replaced with a minimum of down time?	☐	☐
Are the openings in the screen the exact size you want?	☐	☐
Are the openings of uniform size, shape and spacing?	☐	☐
Is the temper of the metal proper for your requirements?	☐	☐
Do you have a minimum of blinding in the screens?	☐	☐
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H&K Perforated Metal Screen

Round Holes

Square Holes

Slots

Oblong Slots

Precision made perforated screens, for your particular requirements. Quickly made to your order.

Round holes up to 6". Oblongs, squares and slots of various dimensions. Thickness up to 1".

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THE **Harrington & King** PERFORATING CO.

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Please send me—

- ☐ GENERAL CATALOG NO. 42
- ☐ STOCK LIST of Perforated Steel Sheets
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ment. He is author or co-author of technical papers on concrete and mortar. He is a member of the American Society for Testing Materials, American Concrete Institute and Society of Military Engineers.

Western Machinery Co., San Francisco, Calif., has announced the appointment of John P. Hamm as assistant to the president. He has been associated with the company in sales and administrative positions since 1951. Warren L. Howes has been named manager of Western Knapp Engineering Co., a division of the company. He has been with the firm since 1948 and formerly served as eastern division manager. John J. Sheppard, formerly chief engineer, has been made manager of the Hibbing, Minn., district office, and W. F. Richards has been appointed assistant manager. Announcement has been made of the presentation of a safety award to the Hibbing district office by the Accident Prevention Committee of the Associated General Contractors of Minnesota in recognition of 105,000 accident free hours reported by the office.

John P. Hamm

Marion Power Shovel Co., Marion, Ohio, has announced the appointment of E. E. McCartney, Jr., as central sales manager for Illinois, Michigan, Wisconsin, Indiana and Kentucky, with headquarters in Chicago, Ill. Divisional sales managers appointed to assist him are L. G. Currie for Indiana and Kentucky; W. A. Shay, Jr., for Wisconsin, northern Illinois and four counties in northwestern Indiana; and R. B. Falck for Michigan.

Western Precipitation Corp., Los Angeles, Calif., announces the appointment of H. H. Haaland as chief of the precipitator engineering division, succeeding D. H. Wheeler who has resigned. He was formerly chief service engineer. Gilbert G. Schneider has been made sales engineer, Atlanta, Ga., for North Carolina, South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, Louisiana, Arkansas, Oklahoma and Texas. John G. Rehm, formerly construction engineer, has been appointed sales engineer in the precipitator sales division of the Los Angeles office.

Pioneer Engineering Works, Inc., Minneapolis, Minn., has appointed Robert J. Johnson as district representative in New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine, New Jersey, part of Pennsylvania served by Service Supply Co., and the Canadian provinces of Quebec, New Brunswick and Nova Scotia. He was formerly general manager of Smith-Dunn Co.

American Air Filter Co., Inc., Louisville, Ky., has announced the death on February 2 of W. M. Reed, founder and chairman of the board, at his winter home in Ft. Lauderdale, Fla. He was 63 years old. Mr. Reed had retired as president and became chairman of the board two months ago. He was succeeded as president by W. G. Frank, executive vice-president.

Dewey & Almy Co., Cambridge, Mass., announces the election of George W. Blackwood as president and William L. Taggart, Jr., as executive vice-president. Mr. Blackwood joined the company in 1937 and has been a vice-president since 1952. Mr. Taggart became associated with Dewey & Almy in 1927 and was appointed a vice-president in 1948.

The Heil Co., Milwaukee, Wis., has appointed that L. B. McKnight has been elected a director of the company. Mr. McKnight is president and a director of Chain-Belt Co.

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Every Kind

Quick Delivery

Plates, Structurals, Bars, Sheets, Tubes, etc. Carbon, Alloy, Stainless Steels, Babbitt Metal.

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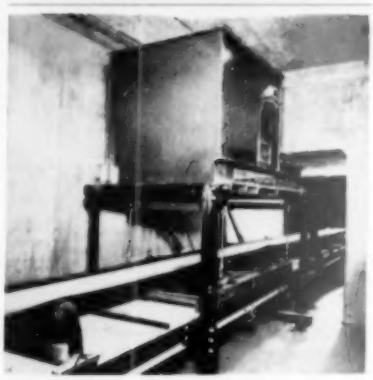
Joseph T. Ryerson & Son, Inc. Plants at New York • Boston • Wallingford, Conn. Philadelphia • Charlotte, N.C. • Cincinnati Cleveland • Detroit • Pittsburgh • Buffalo Chicago • Milwaukee • St. Louis • Los Angeles • San Francisco • Spokane Seattle.



In plants handling Cement, Lime, Gypsum, Sand, Gravel, Crushed Stone, etc. the WEIGHTOMETER is used for fast accurate production.

WEIGHTOMETER gives a continuous, automatic, and accurate weight record of materials in transit at an extremely low operating cost. All producers of bulk materials handled by belt conveyors need this dependable check on production figures supplied by MERRICK WEIGHTOMETER.

Merrick Scale Mfg. Co.
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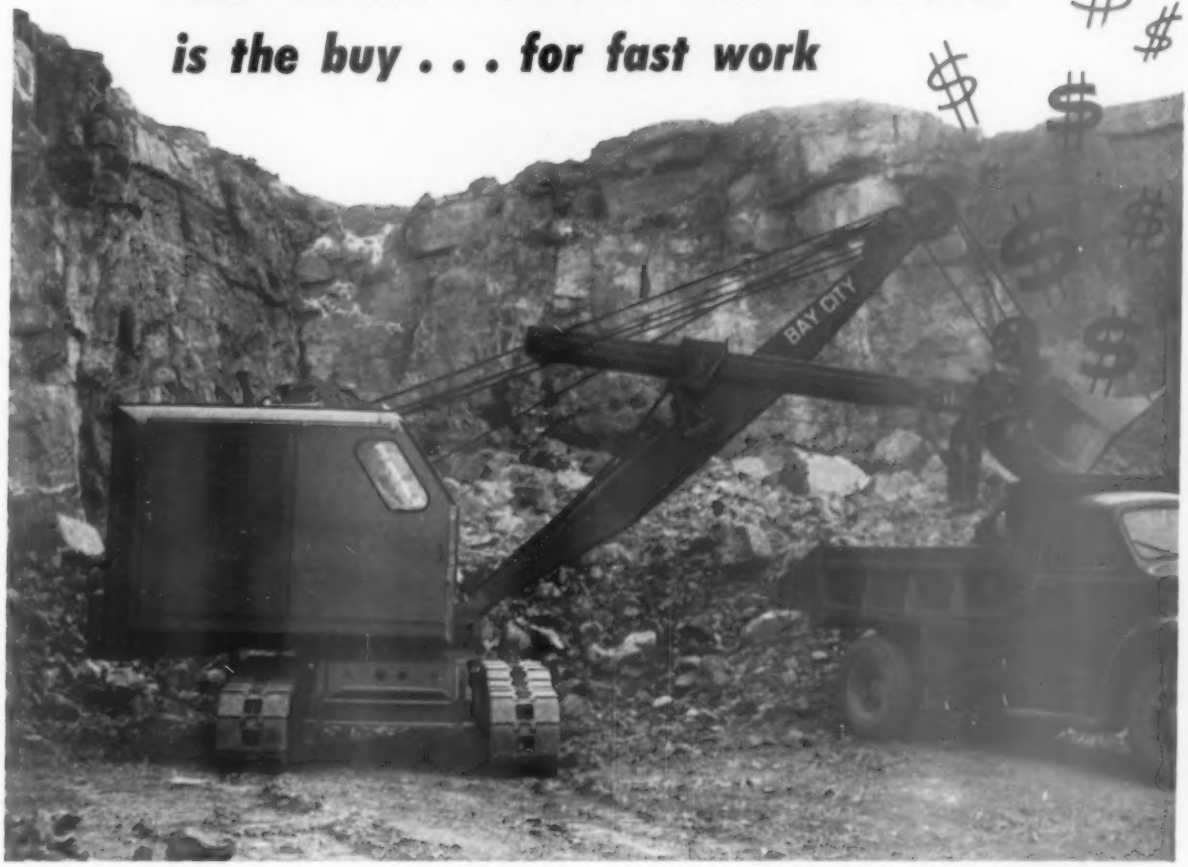
this BAY CITY ¾ YARD
is the buy . . . for fast work



Want performance in a shovel? Then get a BAY CITY ¾ YARD. Its snappy swing, quick, responsive controls, fine balance and powerful engine provide a fast digging cycle. That means dollars to you in the field.

And the rugged, heavy duty construction of this BAY CITY machine means less down time for repairs and lower all-round maintenance costs. More dollar savings to you in the shop.

Fully convertible and equally efficient as a shovel, hoe, dragline or clamshell. Get the complete facts from your nearest BAY CITY dealer or write today for our abundantly illustrated catalog.

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Manga-Tone N.M. will rebuild them better than new

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It's nothing short of a crime to go on year after year throwing away valuable and expensive manganese castings just because the USEABLE SURFACES have become worn beyond efficiency. Crusher Plates are a case in point. Generally the corrugations average only 10% of the weight of the plate but 90% of the plate ends up in the scrap pile.

Look closely at the actual photograph above and see how we can correct this condition and save you plenty of money by rebuilding your used plates with MANGA-TONE N.M. Notice the partially completed plate with the perfect corrugations back in place. To top it off, you will find that the corrugations we rebuild on your old plate will crush about 40% more material than the original corrugations.

Call in our field man. Why waste any more good money and castings!

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So you can have the bucket that will fit your job whether it's rehandling sand or large pieces of limestone.

So it will fit your crane whether it's a small truck-mounted type or a big crawler.

So it will fit your present cable.

All these add up to 304 different possible combinations.

To select the proper size, weight and type bucket for the most efficient and profitable operation of your crane usually requires the service of a competent distributor's or manufacturer's sales engineer.

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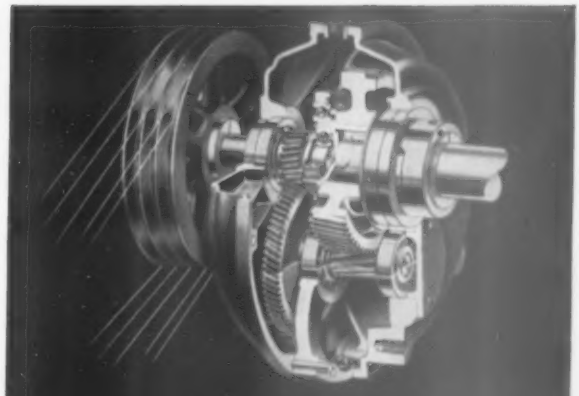
BLAW-KNOX

BLAW-KNOX CLAMSHELL BUCKETS



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POWER-TRANSMISSION DIVISION
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ELEVATING AND CONVEYING EQUIPMENT

•Greater Strength•
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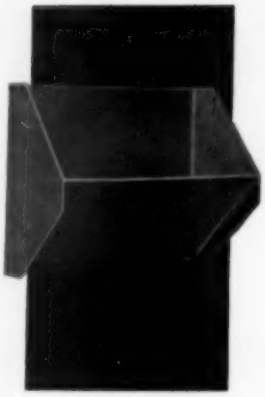
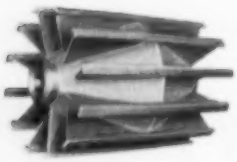
CONTINUOUS ELEVATOR BUCKET STYLE No. 2

Put this Standard Bucket to work handling the toughest materials, and it takes the job right in stride—resisting abrasion, corrosion and wear. This bucket is typical of the complete line of low cost, rugged Standard Steel Buckets — available in Salem, Style "A," shelf type and other continuous style buckets.





STANDARD WING TYPE SELF-CLEANING PULLEY

The most severe operating conditions won't bother this Standard Pulley because its all-steel welded construction gives it far greater strength and resistance to breaking. And yet it weighs less . . . costs less.

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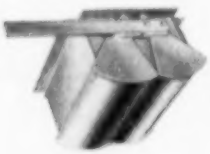
Profit from faster, easier material handling made possible by this gear-operated all-steel Standard Bin Gate. Other styles in Standard Bin Gates also available.



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The Standard Metal M'f'g Co. SINCE 1921

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Eliminate costly, time-consuming drilling or blasting with this low-cost production tool. Rugged, durable Frederick Drop Balls provide you with quick, easy crushing power where you want it—when you want it, with little or no maintenance. Frederick's exclusive "pear-shaped" design withstands greater impact and gives straighter "pin-point" drops. Exclusive "E-Z Swing" steel eye is recessed to prevent excessive ball movement and keep hook in place. Nickel alloy is standard on balls 4000 lbs. or over—or, we'll be glad to quote on special alloys if desired.

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Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000
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A satisfied customer writes about Joy LIMBEROLLER Belt Conveyor Idlers:

"Early in 1955 we decided to try four Joy Limberollers on the No. 1 slope conveyor from the primary gyratory crusher in the quarry.

"This conveyor carries the product of the primary crusher set at about 5', on a 12 degree slope and running at about 450 feet per minute. Originally designed for 400 ton per hour capacity; there have been surge loadings of twice this amount.

"While the balance of the conveyor system is the enclosed gallery type; the No. 1 slope conveyor was not fully completed before the start of production season and consequently ran all year exposed to all kinds of weather.

"The Limberollers have carried a few hundred thousand tons of heavy stone with absolutely no maintenance. On the basis of this record we have placed repeat orders."

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MASSACHUSETTS BROKEN STONE COMPANY

LIMBEROLLERS, at work on conveyor at Massachusetts Broken Stone Company.

The Joy Limberoller resists dust, abrasion, corrosion and material buildup. Resilient discs on a flexible steel cable conform to load and cushion the belt. Only two bearings are used and these are up out of the dirt zone. Get details from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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to low-cost bucket elevator service

HERE'S why Link-Belt Cast Buckets will pay off in longer life, better handling. These rugged buckets have uniform sections and smooth surfaces, thanks to special casting techniques. Their corners, lips, ends, and backs are reinforced for maximum rigidity.

Get all the facts on Link-Belt's broad line of cast buckets for both belt and chain. Book 2465 gives full ordering information. All styles are available in malleable iron or Promal and can be made of aluminum or bronze. See your nearest Link-Belt office or distributor.

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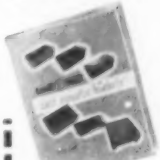

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Please send me immediately a copy of Book 2465, "Link-Belt Cast Elevator Buckets."

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performance-proven on the toughest jobs

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McNally Pittsburg centrifugal pumps are built specifically to reduce the cost of handling corrosive slurries.

Available in a wide range of sizes in complete systems or single units, these pumps reduce the cost of maintenance because the parts that take the punishment are made of special Ni-Hard alloy iron in McNally Pittsburg's own foundry.

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Pressure or Vacuum

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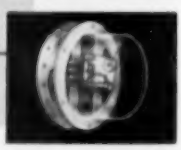
ROTO-BIN-DICATOR

BIN-DICATOR
BIN-FLO AERATOR



Low pressure air diffuser assures steady flow of fine, dry materials that tend to pack in storage.

The original diaphragm-type bin level indicator for all ordinary applications.

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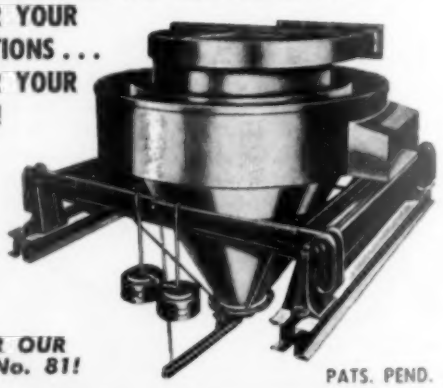

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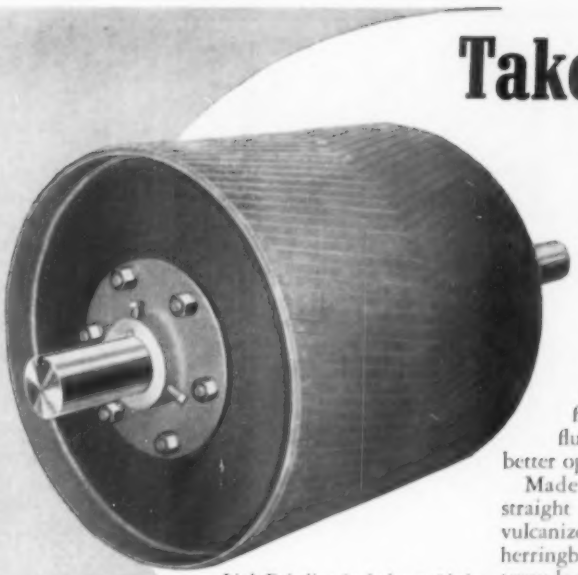
906 NORTH WATER ST. • MILWAUKEE 2, WISCONSIN



Link-Belt line includes welded steel and gray iron pulleys as well as welded steel slat pulleys.

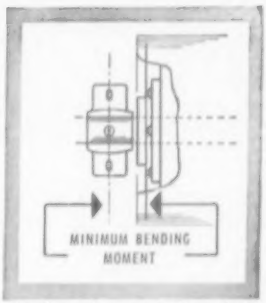
Takes the work out of field mounting

LINK-BELT assembles pulley on shaft—insures correct keyseat alignment

YES, you get a two-way dividend because Link-Belt mounts belt conveyor pulleys on their shafts at the factory. What's more, the flush-hub construction means better operation.

Made with either crowned or straight face, they are available with vulcanized lagging, either plain or herringbone. Your choice of bolted or taper lock hubs.

You can get complete information on belt conveyor pulleys from your Link-Belt salesman. Call him today.



Flush hubs minimize shaft deflection, cut hub bolt stress and disc deflection.

LINK-BELT

WELDED STEEL CONVEYOR PULLEYS

13.414 A

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Next time you replace spray nozzles . . . be sure they're from Spraying Systems. See for yourself how properly engineered, precision machined spray nozzles can improve performance. With Spraying Systems you gain all the advantages of advanced research and production . . . from America's leading designer and producer of spray nozzles.

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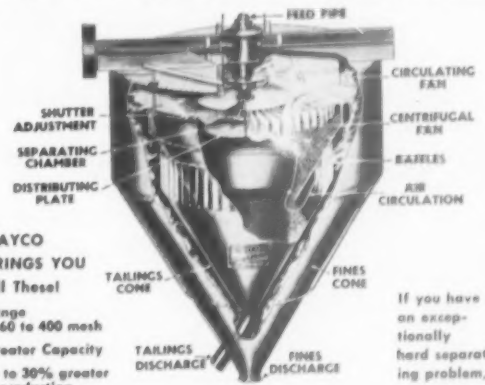

GAYCO BRINGS YOU All These!

- Range 60 to 400 mesh
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- Slow speed for slow wear
- Quick and easy adjustments

"TIMKEN BEARING EQUIPPED"

If you have an exceptionally hard separating problem, TRY THE GAYCO.

Closer separations are possible with the Exclusive Gayco Centrifugal sizing fan. Higher production results from a more complete removal of the fines made by the mill. The efficient Gayco sizing eliminates all undesirable oversize from the product.

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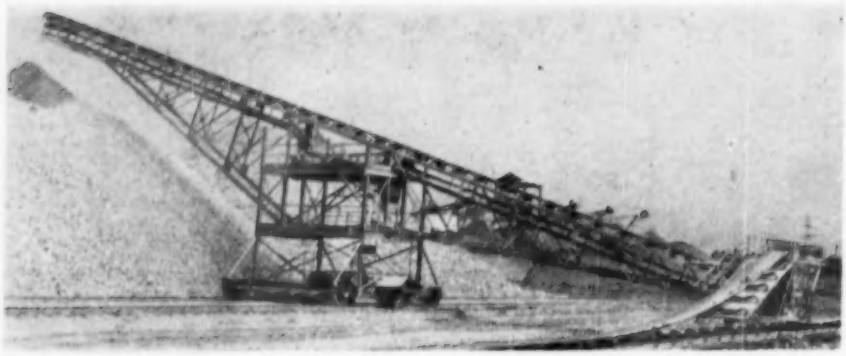
TRANSALL BELT CONVEYORS



Transall STACKER was designed to meet a special storage problem for Stockbridge Stone Company. The stacker belt is 36" wide and approximately 150' centers operating at an angle of 18°. It was designed to handle 525 TPH of minus 8½" limestone at a belt speed of 340 FPM.

STACKER can be moved back and forth while operating full load. Movement of stacker is accomplished by push button control located adjacent to the primary crusher. The crusher operator can move the stacker into any desired position for storing various grades of rock as they are delivered to the crusher.

PERFECTERS OF THE PRE-LUBRICATED CONVEYOR IDLER

The Stockbridge Stone Company, Calera, Alabama, chose Transall conveying equipment for their new plant because they and their affiliate companies have been using Transall equipment in their other plants for many years. The stacker, of course, is the focal point of this job in that it is unique in design. Here again the ingenuity of Transall Engineers has been demonstrated. If you have a storage and reclaim problem, please feel free to consult us. There is no obligation.

In addition to the original thinking that went into the stacker design, other interesting features were engineered into this job. For instance, 35° impact idlers were used at all loading points to eliminate skirt plates (which are always a hazard). Thirty-five degree idlers were also used on the tunnel belts which made it possible to load these belts at a number of points without the use of skirt boards. "V" shaped plows were located in front of each tail pulley. Sloping shields were furnished over the pulleys on all vertical take-ups to shed material; thus preventing stone from getting between belt and take-up pulleys. Rock box type transfer and loading chutes were used throughout and were made of wear resisting steel.

The 35° impact idlers have proved exceptionally successful not only on this job, but on many similar jobs. Operators are finding that the elimination of skirt plates have in many cases avoided costly accidents to their conveyor belts and have reduced belt wear. WHY DON'T YOU TRY OUR 35° IMPACT IDLERS?

PLEASE SEND FOR YOUR COPY OF OUR NEW BELT CONVEYOR BULLETIN #915 DESCRIBING OUR PRE-LUBRICATED IDLERS

TRANSALL, INCORPORATED

(Conveyor Division) 109 N. 11th Street, Birmingham, Alabama

Manufacturers — Engineers — Fabricators — Erectors

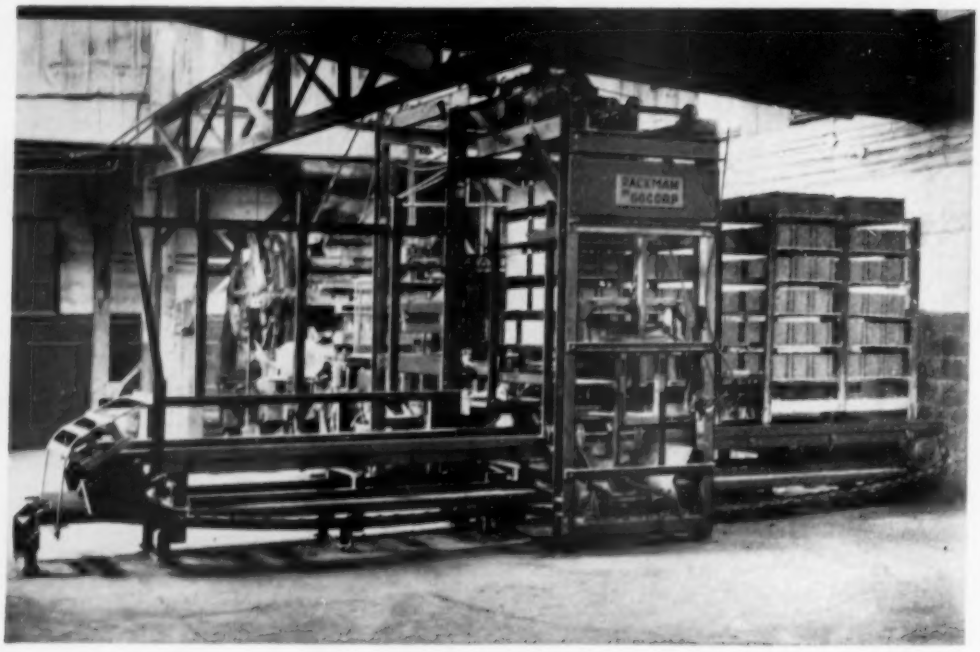
CONCRETE PRODUCTS

A SECTION OF ROCK PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE

Prestressed concrete casting yard of Louisiana Bridge Co., Mandeville, La.

NOW AN AUTOMATIC RACK LOADING DEVICE . . . FOR YOUR BLOCK MACHINE!



*RACKMAN by GOCORP

RACKMAN AUTOMATICALLY removes green blocks from your block machine and indexes them gently onto the decks of the rack.

RACKMAN AUTOMATICALLY removes empty pallets and returns them to your block machine front pallet feeder. Automatic front pallet feeder may be added as an optional extra with RACKMAN.

RACKMAN AUTOMATICALLY shifts racks. Your lift truck operator merely places racks with empty pallets on conveyor and removes loaded racks.

RACKMAN AUTOMATICALLY removes cured blocks, *if you wish.* With additional equipment, RACKMAN will automatically remove pallets of cured blocks and convey them to your cubing station as it indexes green blocks into the rack. Empty pallets return automatically to the block machine.

CONTINUOUS AUTO-OPERATION is provided by RACKMAN keyed directly to the cycle of your block machine. Increases daily production.

AVAILABLE NOW for use with most high-production plain pallet block machines.

NO PITS REQUIRED—RACKMAN is entirely above the floor.

MOST PLANTS have ample room for installation.

TESTED AND PROVED in actual plant installations.

*Trademark—Pat's Pending

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OTHER COST CUTTING GOCORP EQUIPMENT

Concrete Block Machines both plain and cored pallet types • Batch Mixers—12-75 cu. ft. • Block Cubers • Skip Loaders—to match mixers • Magnetic Offbearing Hoists • Other Supporting Equipment

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INDUSTRY NEWS

Cover Picture

ON THIS MONTH'S CONCRETE PRODUCTS COVER is an aerial view of the prestressed concrete casting yard set up by the Louisiana Bridge Co., at Mandeville, La., to produce bridge decks and piling for the Lake Pontchartrain Bridge. The plant cost about $4,500,000. In the view of the casting yard may be seen the concrete piling storage area on the left, next the stressing racks, and spinning and form-handling area. Across the road to the right is one slab casting bed with cap fabrication in the foreground, the reinforcing steel assembly area and two slab casting beds on the right. A portion of the bridge is visible in the far background.

Concrete Block Development

A RECENTLY DEVELOPED CONCRETE MASONRY UNIT, known as "Shadowal" block was introduced at the 36th annual convention of the National Concrete Masonry Association in New Orleans, La. The block is an adaptation of the standard modular concrete masonry unit, involving the use of a ⅜-in. recess in either triangular or rectangular shape on the face of the concrete masonry unit. By using various forms of bonding, a variety of geometric patterns can be made. Pattern dimensions of the modular block are: $3\frac{3}{16}$ in. from the top of the recess to the outer edge of the block or 4 in. from the top of the recess to the middle of the mortar joint.

A patent has been applied for and assigned to the N.C.M.A.; "Shadowal" block will be available for manufacture only to N.C.M.A. members. Development and research are being conducted to perfect the manufacture of the units. It has been estimated that the "Shadowal" block units will be in production by early summer.

Adds Batching Plant

SOUTHERN PACIFIC MILLING CO., Santa Barbara, Calif., has begun operations at its recently completed concrete batching plant in San Luis Obispo county, Calif., bringing total plant installations to 14 in the three counties of San Luis Obispo, Santa Barbara and Ventura. The latest plant increases the company's capacity in the area from 35 to 125 cu. yd. of ready-mixed concrete per hour.

In addition to the new plant, the company has also renovated the adjoining buildings, and has five 6½-cu. yd. transit-mixer trucks operating out of the plant, serving the San Luis Obispo area.

Two designs which may be made by using various forms of bonding "Shadowal" block, a recent development of the National Concrete Masonry Association

KENDRICK CONCRETE PIPE CO. OF ALABAMA, INC., Montgomery, Ala., has been incorporated, with an authorized capitalization of $16,000. Officers and principal stockholders are: J. K. Kendrick, president; Robert William Toler, vice-president; and Edna D. Kendrick, secretary-treasurer, all of Columbus, Ga.

REMINGTON READY MIX CONCRETE INC. has begun operations at its recently built ready-mixed concrete plant at East Poultney, Vt. The plant will service a 25-mile radius from East Poultney. Wendall N. Remington of Rutland, Vt., is president of the firm.

WINNEBAGO CEMENT TILE & BLOCK CO., Winnebago, Minn., has been purchased from Marvin Fields by Alvin Kalke, owner of the Kalke Block & Tile plant, New Richland, Minn. The new owner has announced plans to expand and modernize the plant in the near future.

LA CRESCENT CONCRETE PRODUCTS CO., INC., has been formed in La Crosse, Wis., by Philip G. Arnesan of La Crosse, with an authorized capital of 500 shares of common stock at par value of $100 per share.

CONCRETE PRODUCTS CO., Rogers, Ark., a recently incorporated firm, has started operations at a concrete products plant. Omar Jaspering is manager of the company.

FRED HAMILTON SAND CO., INC., Oklahoma City, Okla., has been incorporated by Fred Hamilton, Charles R. Burba and Violet E. Hamilton of Oklahoma City. Capital stock is $20,000.

LAKE CHARLES READY MIX CO., Lake Charles, La., has been granted a corporation charter, with an authorized capitalization of $20,000.

LYNCH READY MIX CONCRETE, INC., Wichita, Kan., has been granted a corporation charter, with an authorized capitalization of $50,000. Eugene G. Coombe was named resident agent.

J. H. LOOMIS CONCRETE CO., Akron, Ohio, is building a concrete batching plant in Macedonia, Ohio. The plant will serve a fleet of 15 ready-mixed concrete trucks.

SOCIÉTÉ DES CIMENTS DU KIVU has been incorporated in the Belgian Congo, to produce cement in the eastern part of the territory. The plant is expected to have an initial production capacity of 30,000 tons annually.

HARPER SUPPLY CO., Napoleon, Ohio, has moved its ready-mixed concrete plant from West Front street to a new location on State Route 108.

Ertrane C is packed in lightweight 60 lb. multiwall bags for easiest handling and storage.

Ertrane C can be added to the mixer dry or dissolved readily in *cold* water and added. This unique flexibility of application makes it by far the most economical air-entraining agent to use.

This air-entraining agent saves money 4 ways!

Yes, Ertrane C can save you time, labor, dollars—for instance:

1. Lightweight—easier handling and storage. Ertrane C is packaged in a 60 lb. multiwall bag.
2. Lower shipping costs. Ertrane C is 100% active; you are not paying freight on water. Also no danger from freezing.
3. Flexibility of use. Ertrane C can be used either dry or in solution. 3 bags (180 lbs.) of Ertrane C into 125 gallons of water make a 15% solution.
4. No additional chemicals required.

So by all means make us prove it. Write today for complete information on Ertrane C.

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PLANTS: Harrison, N. J.
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BIG PROFITS FOR READY-MIX OPERATORS

WITH RCA TWO-WAY RADIO

Why are the leaders choosing RCA 2-Way Radio?

Most of them say they are impressed by RCA's fine service organization and the years of RCA leadership in radio and electronics. Look for these marks of quality: Superior crystals, tubes and microphones for plainer talking, longer life . . . heavy-gauge steel case for rugged service . . . color-coded tuning for simplest maintenance . . . expert service by RCA Service Company to assure peak performance.

You are always in touch with your drivers when agitator trucks and supervisors' cars are equipped with RCA 2-Way Radio. As a result . . .

- Trucks can be re-routed in emergencies, avoiding delays and losses, increasing profits.
- Plants can close earlier and users report savings in overtime up to 20-30% per month by knowing in advance when the last truck will be in.
- Trucking productivity is vastly improved . . . 10 trucks radio-equipped have been found equal to 11 trucks (or more).
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- Faster service you can render makes a hit with your customers . . . it's a money-maker for them . . . business-getter for you.

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☐ Have an RCA Communications Specialist make a free RADIO SURVEY of my business.

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1100 CU. YDS. WAS ONE DAY'S POUR: Non-stop pour and placement of 195 Jaeger truck mixer loads, totalling 1100 cu. yds. in 13 hours, helped to meet an unusual foundation problem on Buffalo's new $4 million branch of the Federal Reserve Bank of New York.

Water table only 10′ below ground level necessitated a 4′ thick pressure slab which had to be poured monolithically and quickly in the sub-cellar excavation.

Two 40′ portable conveyor belts were used to carry material to center area of pour where chutes could not reach. As many as eight of Gravel Products Corporation's Jaeger mixers maintained a steady flow of concrete. William L. Crow Construction Co., contractor, reported concrete handling costs were only $1 per yd. by this method.

Your Jaeger payload keeps growing

Every year, more ready mixed concrete is produced in Jaeger truck mixers than by any other method. The margin of advantage to Jaeger owners is even greater in this year's new "D" models. Shorter center of gravity, reduced weight, 3-speed transmission and faster charging and discharging enable the 1956 Jaegers to produce consistently bigger daily yardage. The perfecting of structural and mechanical elements further insures that your new Jaeger will average less maintenance time, and cost, than any mixers you have operated to date.

3½ to 8½ yd. units, to meet any need

As the industry's leader, Jaeger offers the widest range of choice in mixer types and in optional equipment to fit individual plant requirements, operating practices and load limitations. Your Jaeger distributor knows your own local conditions thoroughly and how Jaeger mixers can be equipped for the most efficient operation with your set-up. Check with him — or write us for Catalog and complete information.

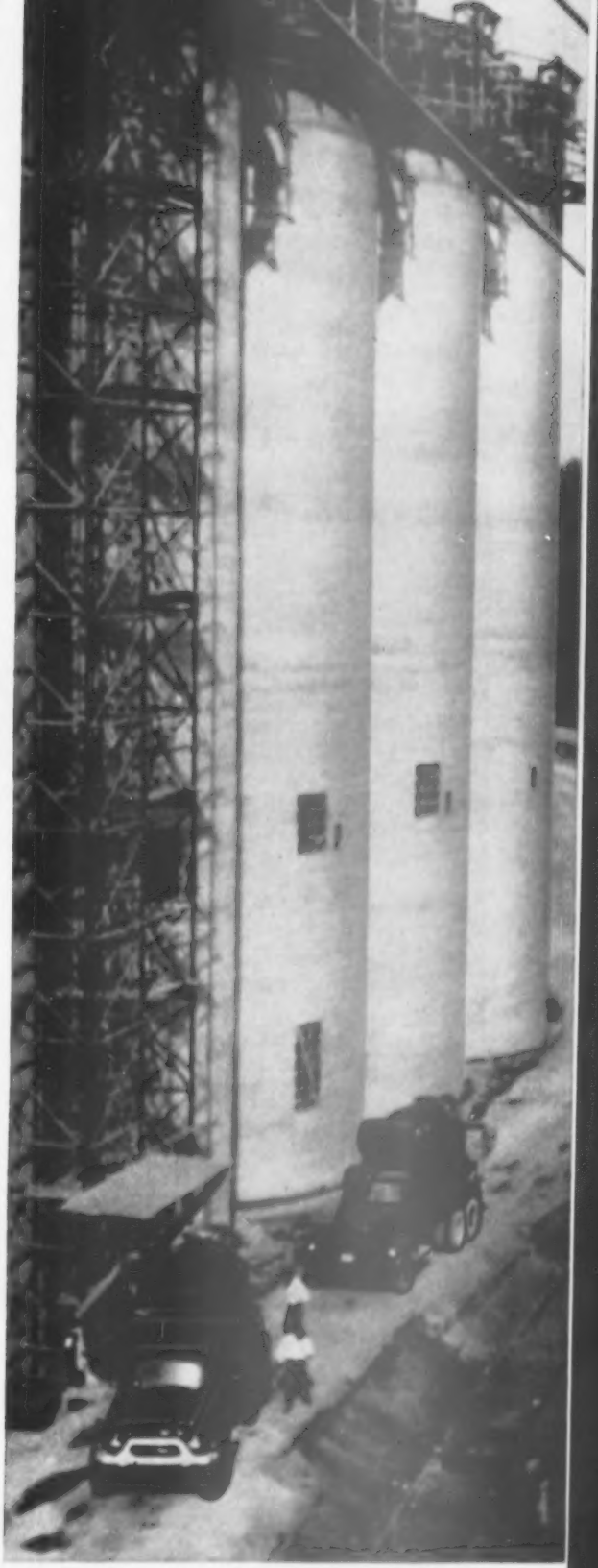
THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio

50th yard JAEGER

Air Compressors • Pumps • Loaders • Concrete Mixers • Paving Machines

MODERN PAYLOAD PRODUCERS: Every advanced feature is shown in these latest type agitators of Samson Block & Supply Co., Media, Pa., including 4-axle mounting, radio-telephone equipped cab and hydraulic fingertip control of 13 ft. chute. Only Jaeger, as the industry's leader, builds this top-loading agitator with completely sealed drum for maximum payload production.



HELPING TO RELIEVE THE CEMENT SHORTAGE: To increase the capacity of one of the South's large cement plants, 9000 cu. yds. of specification concrete are being furnished for the high speed construction of foundation and storage silos. The "around-the-clock" pour required for slip-form construction was handled by five Jaeger "Mix Plus" truck mixers of 4½ to 6½ yd. capacity, on a 2-mile haul from plant to job.

4 trucks or 40

2-way radio means more profit for any size fleet!

If you've thought 2-way radio was only good for the big ready-mix operator with dozens of trucks—take a look around. Some of the most enthusiastic radio users have fleets of fewer than 10 mixers.

It isn't the number—it's the *efficiency* that tells the profit story. Radio dispatching helps you run trucks at peak productivity by trimming out the wasted miles and minutes.

Check these ways a Motorola 2-way radio communication system can save you money and bring in new business:

- ***By rerouting mixers, when necessary, to alternate customers—on short notice, while trucks are en route.***
- ***By freeing your heavy trucks from partial loads.***
- ***By releasing pre-mix plant crews immediately following the day's final pour.***
- ***By slashing down-time on disabled mixers through speedy repairs.***
- ***By giving better service to contractor customers via radio relay of instructions.***
- ***By eliminating all telephone calls from drivers.***

When you are buying radio, you'll soon see why ready-mix companies choose Motorola *more often* than all others *combined*. One big reason is that it's built for rugged use—designed to *outlast* several trucks. Let a Motorola Engineer show you the many other reasons why Motorola tops the field. He'll also show you how Motorola 2-way radio will quickly pay for itself by cutting costs . . . then go on to earn extra profits for you every year. Write, phone, or wire TODAY.

MOTOROLA

2-WAY RADIO

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
A SUBSIDIARY OF MOTOROLA, INC.
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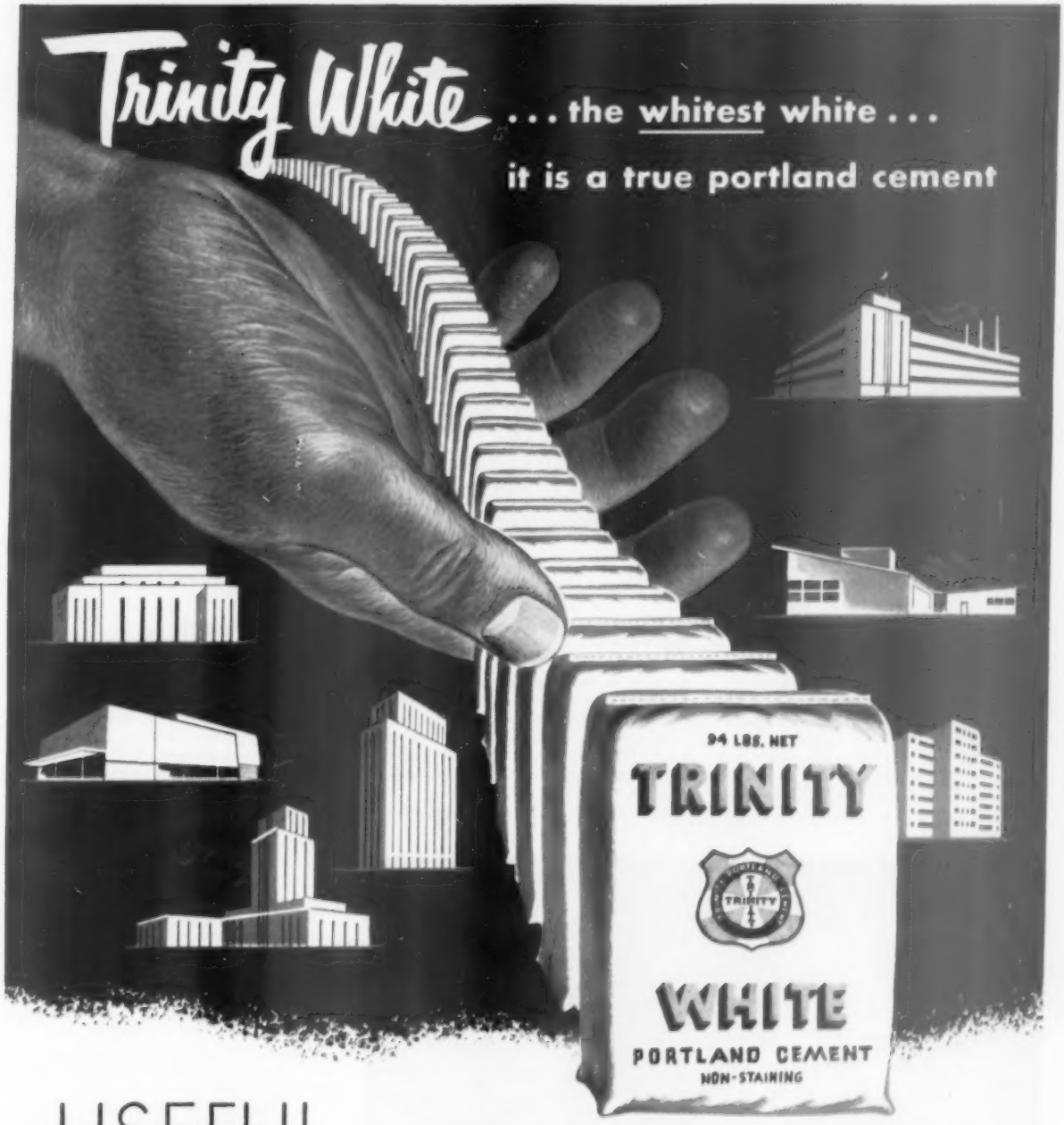
ROGERS MAJESTIC ELECTRONICS LTD. TORONTO, CANADA

Motorola consistently supplies more mobile and portable radio than all others combined.
Proof of acceptance, experience and quality.
The only COMPLETE radio communications service—specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease.
"The best costs you less—specify Motorola."

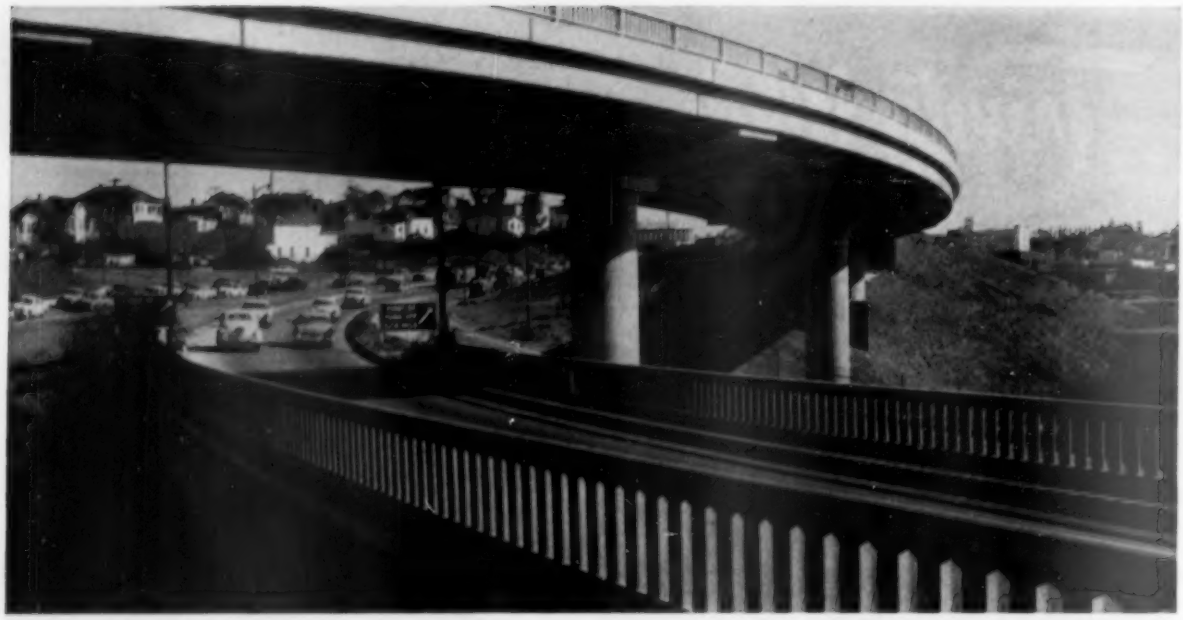


USEFUL in almost every type of building, both inside and outside. As architectural concrete units or as stucco or cement paint, it emphasizes architectural perspective and detail. It has a high light-reflection which gives beauty and special utility to many interiors.

¶ Trinity White's extra whiteness gives truer colors where pigments are added. Widely used in terrazzo for its contrast-y white and better color effects in either simple or ornate designs. Meets all Federal and ASTM specifications. Ask for TRINITY White.

as white as snow

A Product of GENERAL PORTLAND CEMENT CO. • Chicago • Dallas • Chattanooga • Tampa • Los Angeles



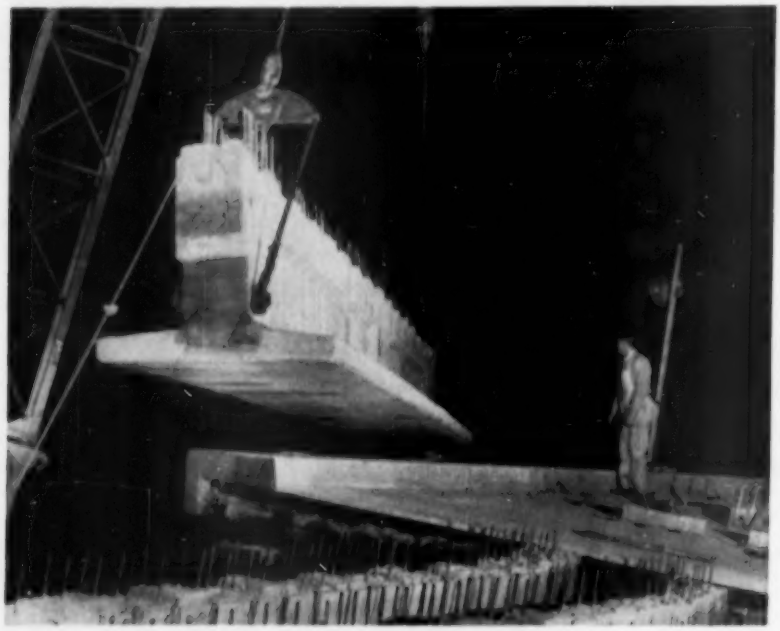
UNDERSIDE OF PRESTRESSED SPAN shows bottom flanges of girders and general shape of step bearings. Roadway is 28′ between curbs. California Division of Highways photos. Warren B. James, resident engineer; Charles McClosky Company, contractor.

Prestressed girders span freeway traffic

IN THE 798′ SEPARATION which completes the San Bernardino-Santa Ana Interchange in Los Angeles, two spans had to cross two lower levels of freeway which carry a 24-hour traffic of 38,000 to 40,000 vehicles on each leg.

The problem was to build these two spans uniform in line and material with the rest of the poured-in-place structure without using falsework in the freeways below. It was solved with 48′ long prefabricated prestressed girders, 8 in each span. These were set at night and the deck was then poured in the usual manner.

The wide, thin bottom flange of the girders, containing ½″ shear and temperature bars on 12″ centers, necessitated a very workable, as well as high strength concrete. This was obtained with a 7-sack mix which developed 4000 psi working strength when properly processed in truck mixers of certified design, capacity, mixing speed and accuracy of water control.



5 TO 6 HOURS, AT NIGHT, PLACED EACH 8-GIRDER SPAN: Girders were cast on ground below and prestressed when concrete reached 3500 psi. With 35 and 40 tons on their three prestressing cables the 48′ long girders showed only ⅛″ rise at center. Note 44″ wide flange only 4″ thick at the edges, 6″ thick at stem. Stem is 36″ high, 12″ thick at the ends.

You have a right to insist on this Rating Plate. It certifies compliance with the high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

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- ★ SQUARE AND OCTAGONAL PILINGS
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- ★ DOUBLE T SLABS
- ★ STATE ROAD TYPE BRIDGE I BEAMS
- ★ PAN TYPE BRIDGE DECK SECTIONS

...in all practical sizes, lengths and gauges to meet modern concrete construction requirements

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SEARS, ROEBUCK WAREHOUSE COMBINES TILT-UP AND PRECAST CONSTRUCTION FOR MAXIMUM ECONOMY

● This new warehouse for Sears, Roebuck & Company, in Jefferson Parish, Louisiana, with 77,000 sq. ft. of floor space, is prefabricated construction, one hundred percent: Tilt-up walls; precast, prestressed concrete I-shape girders, each 30 ft. x 3 ft., with 12-in. flanges; precast concrete double-T roof panels, each 30 ft. x 5 ft. x 12 in. deep.

Buildings like this go up as slick as a whistle—9500 sq. ft. of girders and roof slabs erected per day. That is the big thing about concrete prefabrication—it makes fullest effective use of every man-hour of time put against it. Manufactured to closest tolerances, for fast erection with minimum supervision, structures like this represent the most effective application of the assembly-line principle to building construction.

Lone Star Cement was used in heavy-duty floors, in tilt-up wall panels and precast roof slabs. 'Incor'* 24-Hour Cement was used in prestressed girders, for economical fabrication speed, and for the well-established reason that prestressing makes fullest use of the always dependable high-early and high-ultimate strength of America's FIRST high-early strength portland cement. *Reg. U. S. Pat. Off.

SEARS, ROEBUCK & COMPANY
Warehouse—Jefferson Parish, La.
Architect: GEO. SAUNDERS
Structural Engineer: WALTER E. BLESSEY
Prefabrication by:
HOGAN BROS., INC., General Contractor
Ready-mix Concrete:
JAHNCKE SERVICE, INC.
BERT WEAVER MATERIALS INC.
—all of New Orleans

LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS. 18 MODERN MILLS, 38,000,000 BARRELS ANNUAL CAPACITY

Looking from the top of the concrete batching tower, showing barge-unloading slip, stockpiles of aggregates and cement silo

PRESTRESSED CONCRETE for World's Longest Vehicular Bridge

• Lake Pontchartrain Bridge, 24 miles long, will be built with prestressed concrete piles and deck spans. Spinning process for manufacture of hollow cylindrical piles

By JOSEPH J. WADDELL*

ONE OF THE LARGEST PLANTS OF ITS TYPE is now operating in southern Louisiana manufacturing prestressed deck units and piles for the Lake Pontchartrain Bridge. This 24-mile-long bridge is a major link in the Greater New Orleans Expressway connecting the comparatively undeveloped north shore of Lake Pontchartrain in St. Tammany Parish with Jefferson Parish and nearby New Orleans on the south shore. It will furnish direct access to the New Orleans area from Jackson, Miss., and other points in the Mississippi Valley. According to Palmer and Baker, Inc., consulting engineers who designed and are supervising construction of the project, it will be the longest vehicular bridge in the world.

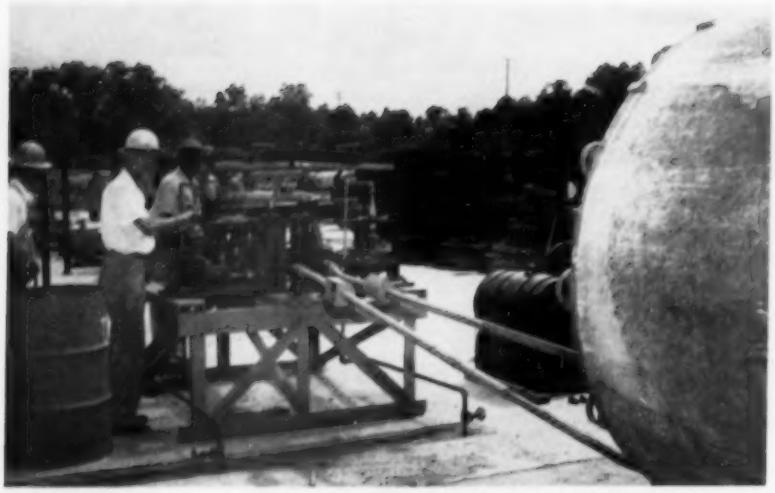
Total cost of the project is about $40,000,000, $28,000,000 of which represents the cost of the bridge proper. Principal quantities are 415,000 lin. ft. of 54-in. piles and 2235 prestressed deck spans. The structure will require 296,000 cu. yd. of concrete, 19,000 tons of deformed reinforcing steel, 3000 tons of ⅜-in. prestressing cable and 2940 tons of 0.192-in. prestressing wire. Union Wire Rope Corp. supplied the prestressing cable and prestressing wire. The bridge consists of monolithic deck and prestressed beam units resting on concrete caps which in turn are supported by 54-in. diameter hollow prestressed concrete piles, two piles to a bent. Bents are spaced 56 ft. on centers.

To provide facilities for mass production of concrete castings of unprecedented size the contractor, Louisiana Bridge Co., built a $4,500,000 plant and casting yard near the town of Mandeville on the north shore of the lake. Covering a 38-acre site, this casting yard has a weekly capacity of 48 deck slabs, each 33 ft. wide and 56 ft. long; 80 hollow cylindrical piles 96 ft. long, and 50 precast bent caps, each 3 x 3½ x 32 ft. Concrete production has run over 6000 cu. yd. per week, with a daily maximum of over 1500 cu. yd.

Engineering Design

The deck units are manufactured in the yard complete except for the aluminum handrail, and barged to the site of the bridge. Each unit is 33 ft. wide overall with a 28-ft. roadway, and 56 ft. long. The 6½-in. deck is carried on seven beams, 4 ft. deep. Prestressing of the unit is accomplished

*Materials engineer, Palmer & Baker, Inc., Mandeville, La.



Stressing wires are pushed through the two tubes into the ducts in the concrete pile with this machine

by means of ⅜-in. x 7 cables of stress-relieved high tensile steel wire with a minimum breaking strength of 20,500 lb., 0.2 percent offset yield point of 16,500 lb. and an average modulus of elasticity of 28,000,000 p.s.i. There are 25 of these strands in each of the seven beams. These tendons are tensioned to a stress of 160,000 p.s.i. for the purpose of introducing a compressive stress in the concrete of the beams. Normal reinforcement is provided in the deck and curb, with stirrups extending into the beams. There are two diaphragms, 18 ft. from the ends of the unit. These are reinforced normally, with no prestressing. Weight of each deck unit is 180 tons. Concrete for these decks was specified to have a minimum cement factor of eight bags per cubic yard and compressive strength of 5000 p.s.i. at 28 days.

The piles are hollow cylindrical shells, 54 in. in outside diameter and 4 in. thick, designed to be manufactured by the centrifugal spinning process in 16- or 8-ft. lengths. Conventional reinforcing cages are made of ¼-in. wire spirals spaced 4⅞ in. with four ⅜-in. longitudinals, except that the head sections have the same wire spaced 2¾ in. These head sections are also made 5 in. thick at the driving end by using a 5-in. end ring in one end of the form instead of 4-in. Sections are assembled into piles of the required length, stressed and grouted. Post tensioning is accomplished by means of 144 high tensile steel wires divided into 12 groups of 12 wires, each group placed in a separate longitudinal duct in the pile. The wire, 0.192 in. in diameter, is specified to have a tensile strength between 195,000 and 240,000 p.s.i., a yield point (0.2 percent offset) of 180,000 p.s.i., with an elastic limit (Johnson's) of 170,000 p.s.i., and an average modulus of elasticity of 28,000,000 p.s.i. These wires are tensioned to 150,000 p.s.i., which, upon release of the end anchorages, transmits a compressive stress of 1000 p.s.i. to the concrete of the pile. Concrete in the piles is specified to have a minimum compressive strength of 5000 p.s.i. in 28 days, containing six bags of cement per cu. yd.

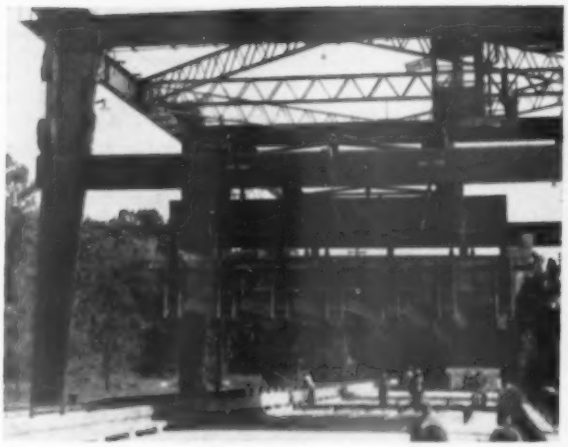
Slab Fabrication

There are three casting beds for the slabs, each bed consisting of eight slab forms in line. Forms are of all steel construction so arranged that they can be backed off or opened mechanically by means of manually operated levers, thus permitting easy removal of the completed slab sections with the 200-ton gantry crane. This crane, operating on standard gage railroad track on each side of the casting bed, transports the slabs to the special lifting cradles resting on the transportation barges.

To commence a cycle of operation after removal of a set of eight slabs, the first operation is to clean the forms by means of pneumatic brushes and hand tools, then spray on the form oil, close the forms, and place the top half of the steel bearing plates in

Above: Lift truck with attachment for handling concrete pile section in the yard

Left: One of the concrete pile spinning machines; batching and mixer tower in the background



Slab suspended from 200-ton gantry which straddles the casting bed is on its way to the barge

Barge carrying two deck slabs to the bridge site

the bottom of the beams. Swift cars at the end of the casting bed support 25 coils of ⅜-in. stressing cable. These strands are fed through an anchor plate and grillage in the dead end, into a grillage on a pull sled where they are anchored with "Reliable" strand grips. The sled is pulled with an air tugger through the entire length of eight forms (a distance of 480 ft.) to the jack end where the grillage is fixed in place in the jacking assembly. The 25 cables now lying loosely in the bottom of the beam form are pulled taut by hand, cut to length with a burning torch and strand grips attached behind the dead end anchor plate in the fixed grillage. The entire group of strands is now tensioned with a special hydraulic jack that applies a load of 332,000 lb., elongating the cables 32¼ in. and stressing them to 160,000 p.s.i. As the strands elongate, a screw device on the jack moves with the moving head and holds the cables in the elongated position when the hydraulic pressure is released. This operation is repeated for the other six beams in the bed.

Meanwhile, assembly of the reinforcing steel has been proceeding on jigs alongside the adjacent roadway. Stirrups and spacers are first set in place, then the main mat for the deck is lifted in place by the crawler crane operating on the roadway, followed by the curb and parapet steel. Road angles are now bolted in place on the ends of the forms, special fixtures, if any, installed, line and grade checked and the final cleanup made.

Concrete placing is started immediately. Hauled from the central mixing tower on flatbed trucks, the 2-cu. yd. buckets are picked up by a crawler crane and swung over the form. Placement of concrete is by conventional methods, special care being taken to assure consolidation of the concrete in the bottom of the beams around the stressing cables. Normal procedure is to place the concrete in the beams first, then in the deck. High frequency electric vibrators operating at 10,000 v.p.m. are used to consolidate the concrete. A centrally-located frequency converter provides 180-cycle current to convenient outlets located about the job into which the vibrator cords can be plugged.

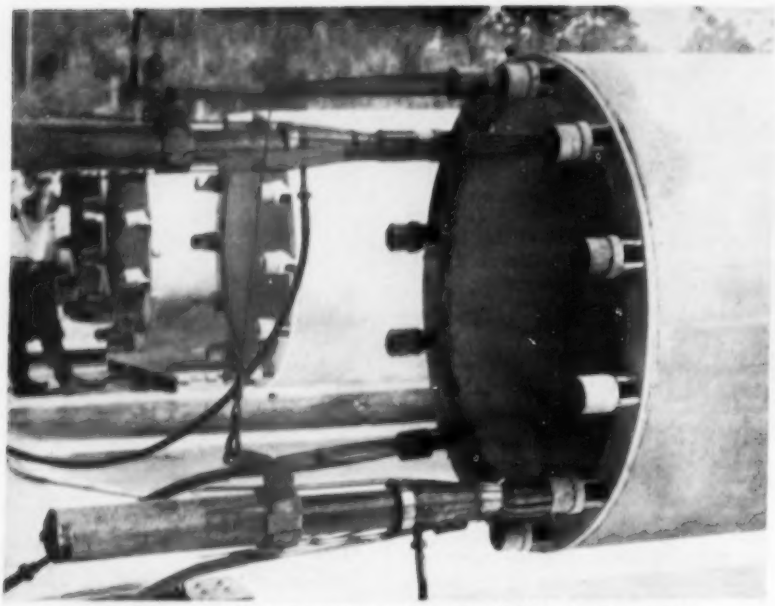
Final finishing of the slabs is done with a conventional road finishing machine modified to operate on special rails provided for the purpose, and after a suitable delay, the surface is sprayed with clear curing compound. Construction joint surfaces between the deck and parapet section (which will be placed later) are wire brushed at this time and protected with burlap. The slab is now covered with a portable housing and steamed for approximately 9 hr. at 110-130 deg. F.; the housing is then removed, forms set for the parapet and curb section and concrete placed therein. These sections are sprayed with curing compound in the same manner as the decks, and the whole assembly steamed for an additional 9 hr. As soon as the slab concrete attains 3000 p.s.i. compressive strength (as determined by field-cured cylinders) the forms are backed off, stressing cables cut and the slabs removed.

In order to cut the strands, it is first necessary to release the jacks. This is done by applying a slight hydraulic pressure at all jacks simultaneously, backing off the retaining nuts, then releasing the pressure on all jacks at the master valve. Removal of the slabs by the 200-ton gantry makes the forms ready for another cycle. At present the cycle requires about 74 hr., permitting the production of 46 slabs per six-day week on the three beds, working two 10-hr. shifts.

Pile Manufacture

Concrete for the piles is dumped directly from the mixers into the hopper of the feeder operating on rails below the mixers to feed the forms in either of the two Cen-vi-ro spinning machines. Controlled by the spinner operator, this feeder introduces the concrete into the slowly-revolving form. After filling and slow speed rolling and vibration, the form is given a high-speed spinning of 350 r.p.m. for 4 min. This compacts the concrete and removes a large portion of the mixing water. The form is now removed from the spinner by a 10-ton overhead crane and placed in a vertical position on a curing car where it remains for 30 min. before being pulled into the 120 deg. F. steam curing room. After 5 hr. of steaming, the loaded car is pulled out the other end of the steam room, the form stripped and the completed section sprayed with clear curing compound before being moved to the storage area by a lift truck. It remains in storage for two weeks.

Meanwhile the form has been picked up by another overhead crane and moved to the cleaning and oiling area. The form is cleaned and oiled with automatic machines, the longitudinal seam closed and the bolts tightened with impact wrenches. Next the reinforcing cage is installed in the form. This cage was formed on an automatic winding and resistance welding machine of the type familiar in concrete pipe plants. For forming the 1⅜-in. longitudinal ducts, mandrels are next placed in the form. Each mandrel consists of a ⅞-in. steel rod bolted into one end ring and wedged in the other, and the rod covered with 1⅜-in. dia. rubber hose. The form is now passed to the crane serving the spinners, and the cycle is repeated. For making 8-ft. lengths, a center divider ring is placed



A 54-in. pile with two stressing jacks under 4300 p.s.i. pressure

in the form before the cages are installed.

After a curing period of two weeks, the sections are picked up by the lift truck and moved to the assembly area. Here they are laid on the racks, assembled into the required length, two piles at a time, and the ducts lined up to receive the stressing wires. Joint surfaces between the sections are coated with a high-strength polyester resin and the sections drawn together, using an air tugger. By means of a special friction drive on an air motor, 12 stressing wires are now pushed through each of the 12 ducts and anchored in conical anchorage wedges at the dead end. At the other end, the 12 wires are "burned" off and wedged into the splines of a special 36-ton hydraulic jack. Pressure is applied to two jacks simultaneously. At a jack pressure of 4300 p.s.i. the wires are elongated one inch for each 16-ft. pile section and are stressed to 150,000 p.s.i. Cone anchors are now driven into place, the jacks removed, and a cement grout pumped into the ducts under 100 p.s.i. pressure. After a suitable curing period, ranging from less than 24 hr. in the summer to over 72 hr. in the coldest weather, the two piles are separated by "burning" the wires between them, the free stub ends of the wires "burned off" and the piles placed in the storage area. From the storage area, the completed piles are picked up by a 75-ton Whirley and loaded on barges for transportation to the pile drivers.

Working 80 hr. per week on the two spinners and 60 hr. on the two assembly and stressing racks, production is slightly over 500 sections or 8000 lin. ft. per week. Normally, actual spinning time for one section is 8 min. for the complete operation, half of it being the high speed compaction spin. Spinning time may be as short as 7½ min. during warm dry weather and as long as 9 min. during cold damp weather.

Casting Pile Caps

Pile caps are cast in an upside down position, using prefabricated reinforcing cages in steel forms. The bottom halves of the bridge bearings are embedded in the concrete at the time of casting. Concrete for the caps is handled in the same way as that for the slabs, the caps being cast at such times as slab casting is not in progress. After casting, the caps are covered with tarpaulins and steam cured for 12 hr. at 100 deg. F. One day later the forms are removed and the caps sprayed with clear curing compound. As soon as the concrete strength reaches 2000 p.s.i. (as shown by cylinders, usually about three days) the caps may be picked up by the gantry and moved to the barges.

CONCRETE DATA
All mixes, 1½-in. maximum aggregate

Class	A	D	E
Where used	Pile Caps Conventional Concrete	54-inch Spun Piles	Prestressed Bridge Spans
Sacks per yard	5.35	7.00	6.50
Required Strength			
7-day	2000	3500	
28-day	3000	5000	5000
Actual Strength			
6-hour		4260	
24-hour		5450	
36-hour			3710
3-day			4500
7-day	3250	7380	
28-day	4290	7960	6090
Air Entrainment	Yes	No	Yes
Admixture	No	No	Yes
Percent Air	4.0	0	3.2
Percent Sand	36	40	34
Slump, inches	2½	0	2½
Water, Gal. per sack	5.9	3.5	4.9

Handling Concrete and Aggregates

All concrete materials are received in barges. Aggregates are unloaded by clamshell into stockpiles over the recovery tunnel. A conveyor belt operating in this tunnel discharges the aggregates on to the elevating belt which raises the materials to the distribution chute on top of the mixing tower. Cement is unloaded from 5000-bbl. barges by means of cement hogs and pumped through two 4-in. pipe lines to the cement bin in the center of the cluster of aggregates storage bins on top of the tower. Admixtures are pumped from ground storage tanks or drums to storage tanks on the batcher floor and are there fed by gravity to their dispensers.

After the several ingredients have been batched in semi-automatic weigh batchers, they are combined as they flow through the swivel chute to one of three 3-cu. yd. tilting mixers. Mixers discharge into a collector cone which passes the concrete into the 2-cu. yd. bottom-dump buckets on the trucks. These buckets are delivered to the various points of use by the trucks.

One station of the swivel chute discharges into an elevating bucket that lifts dry batches to a hopper where they are fed into either of the two 2-cu. yd. Besser mixers. Zero slump concrete is mixed here for the piles.

Concrete for the deck units and for the piles was designed to have a minimum compressive strength of 5000 p.s.i. at 28 days. Preliminary investigation had indicated that normally cured slab concrete containing eight sacks of cement per cubic yard would easily reach this strength. In addition, the specifications required that the concrete have a strength of 3000 p.s.i. before the stressing wires could be cut. Use of steam curing in combination with a cement retarding and water-reducing admixture permitted attaining the high-early-strength required as well as permitting a reduction of cement factor to 6½ sacks per cubic yard with less shrinkage of the concrete and no loss of strength. The quantity of admixture is varied with the ambient temperature, more being used in the warm weather. Slabs were placed at a slump of 2 to 3 in. Entrained air was between 3 and 4 percent. Test cylinders were made in sufficient number to determine, by means of field-cured specimens, when the concrete had reached 3000 p.s.i. Standard-cured specimens were used for the 28-day tests.

(Continued on page 265)

New officers of N.R.M.C.A., left to right: Robert Mitchell, president; John W. Roberts, vice-president; M. Eugene Sundt, vice-president; and F. E. Schouweiler, treasurer

Louis C. Schilling, outgoing president of N.R.M.C.A., and **Robert Mitchell,** incoming president

Technology and Merchandising

Highlight Record-Breaking Ready Mix Convention

• Cement supply, new markets, two-way radio, labor relations, taxes and safety also stressed in sessions

MANY OF THE PAPERS and subjects presented at the 26th annual convention of the National Ready Mixed Concrete Association, held February 13-16, at the Conrad Hilton Hotel, Chicago, Ill., in connection with the biennial exposition at the Coliseum were in joint sessions with N.S.G.A. and are published separately in this issue of ROCK PRODUCTS along with general coverage of the two conventions.

In addition to those subjects, and covered herein, there were separate papers on the cement supply situation, aggregates, the cement testing program of the association, the production of cooled concrete, merchandising and technical matters.

Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif., was elected president of the N.R.M.C.A., succeeding Louis C. Schilling. John W. Roberts, Southern Materials Co., Inc., Richmond, Va., was elected vice-president; M. Eugene Sundt, Albuquerque Gravel Products Co., Albuquerque, N.Mex., vice president; and F. E. Schouweiler, Old Fort Supply Co., Fort Wayne, Ind., treasurer.

Completing the executive committee are: Ralph H. Anderson, Anderson Concrete Corp., Columbus, Ohio; Henry J. Brown, The Cook & Brown Lime Co., Oshkosh, Wis.; John B. Donovan, Valentine Concrete Co., Inc., Springfield, Mass.; Murray S. Simpson, Super Concrete Corp., Washington 7, D. C.

Members of the board of directors are as follows: Ralph H. Anderson, Anderson Concrete Corp., Columbus, Ohio; E. K. Brown, Whitney's, Duluth, Minn., Henry J. Brown, The Cook & Brown Lime Co., Oshkosh, Wis.; Joseph A. Bullen, The Fountain Sand & Gravel Co., Pueblo, Colo.; W. H. Day, Jackson Ready-Mix Concrete, Jackson, Miss.; John B. Donovan, Valentine Concrete Co., Inc., Springfield, Mass.; George C. Eady, Consumers Supply Co., Louisville, Ky.; Stanley S. Ernst, Ernst Fuel and Supply Co., East Detroit, Mich.; James R. Farrington, Ready Mixed Concrete Co., Annandale, N.J.; William J. Hicklin, Jr., Capitol Concrete Co., Jacksonville, Fla.; Charles W. Ireland, Birmingham Slag Co., Birmingham, Ala.; Alvin N. Kelso, W. A. Kelso Building Material Co., Inc., Galveston, Texas; Harold M. Lacy, Dallas Concrete Co., Dallas, Texas; Bert W. Milling, Underwood Builders Supply Co., Mobile, Ala.; Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif.; Walter W. Muirhead, Ross Island Sand & Gravel Co., Portland, Ore.; J. A. Nicholson, Nicholson Concrete Co., Toledo, Ohio; E. J. Nunan, The Buffalo Slag Co., Inc., Buffalo, N.Y.; Raymond F. Powell, Concrete Inc., St. Louis, Mo.; Noel J. Redmond, Blue Diamond Corp., Ltd., Los Angeles, Calif.; John W. Roberts, Southern Materials Co., Inc., Richmond, Va.; Eric C. Ryberg, Jr., Utah Sand & Gravel Products Corp., Salt Lake City, Utah.; F. E. Schouweiler, Old Fort Supply Co., Fort Wayne, Ind.; Murray S. Simpson, Super Concrete Corp., Washington, D.C.; Francis R. Smith, Ready-Mix Concrete Co., Reno, Nev.; M. Eugene Sundt, Albuquerque Gravel Products Co., Albuquerque, N. Mex.; W. S. Walters, Fischer Lime & Cement Co., Memphis, Tenn.; William E. Wilson, Floyd Pappin & Son, Inc., Great Falls, Mont.

A. C. Thomas, The Jaeger Machine

Chas. B. Baker, president, Universal Atlas Cement Co., New York City, left, and **Herbert B. Johncke,** Johncke Service, Inc., New Orleans, who were speakers on the cement supply situation

Co., Columbus, Ohio, is chairman, Truck Mixer Manufacturers Bureau. Honorary Members are: Nathan C. Rockwood, Naperville, Ill., and Stephen Stepanian, Columbus, Ohio.

In his welcoming address, Louis C. Schilling, Miami, Fla., outgoing president, pointed to the outstanding leadership of the association members throughout the country. He expressed deep gratitude to Vincent P. Ahearn, Stanton Walker, and the excellent association staff for their aggressive program of activities.

In reviewing the year's activities, Mr. Schilling referred to numerous state and regional meetings that he and the staff officers attended. Work of the various committees, particularly on cement, depreciation, and labor relations, was also discussed. He reported that during the annual committee meetings in Chicago in August, the Board authorized the inauguration of a cement testing program. A major conclusion of the depreciation committee, he said, was that life of machinery is primarily an individual proposition, conditioned by such local factors as climate, operating hours worked during the year, etc. The speaker pointed with pride to the 1956 exposition at the Coliseum, which was the largest in history.

Cement Supply

In a well-illustrated talk on "Cement in 1956," Chas. B. Baker, president, Universal Atlas Cement Co., New York, N. Y., stated that with another record construction year in sight, the cement shortage would continue in 1956, and this in spite of cement shipments rising an expected 6 percent to a record 320,000,000 bbl.

Mr. Baker emphasized that a real partnership exists between ready-mixed concrete and portland cement producers. This partnership, he said, entails a joint responsibility, calling for full cooperation between the two industries so that the needs of the booming construction industry may be adequately served — now and in years ahead.

The speaker remarked that the ready-mixed concrete industry is the largest user of cement and is taking an ever-increasing share of cement output; in 1955 it accounted for about 100,000,000 bbl. or 35 percent of total output. His company estimates that the share will be 40 percent by 1960, and possibly 50 percent by 1965. If the latter prediction is true, he said, the ready-mixed concrete industry must double its size in the next ten years.

Regarding future cement supplies, Mr. Baker expects the shortage to be alleviated an appreciable extent by 1958. His firm estimates (based on announced expansion plans) that clinker capacity will reach 350,000,000 bbl. by the end of 1956, and 370,000,000 bbl. in 1958. The largest increases, by districts, will be Texas, up 10,500,000 bbl., and the Southeast, up 8,400,000 bbl.

Mr. Baker indicated that the bold expansion plans of the cement industry are well justified in the light of the long range market potential for concrete and concrete products. Among the factors used in making long range forecasts were population growth, percent new construction is of Gross National Product (5½ percent in 1946, compared to 11 percent in 1955), barrels of cement used per point of Federal Reserve Index of Industrial Production (1.8 in 1946, compared to 2.2 in 1955), and barrels of cement used per ton of steel consumed.

To take advantage of the unlimited opportunity ahead, Mr. Baker suggested that the cement and ready mix industries must meet four challenges—namely, the rapid depletion of both cement raw material and aggregate reserves, constant striving to improve quality of concrete, reduction of operating costs (in view of the highly competitive market), and closer cooperation between the two industries in order to achieve mutual objectives. Regarding quality and costs, the speaker cited notable progress already made by the ready mix industry, with such improvements as electronically controlled batching equipment, improved mixers and mixer trucks, and wider use of two-way radio.

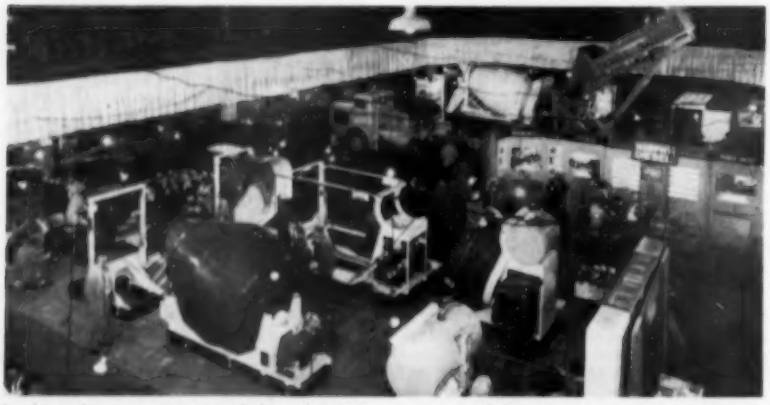
The speaker also lauded the joint cooperative effort of the N.R.M.C.A. and the P.C.A. in promoting a nationwide street paving program; he considered it an important step working for the good of both industries. He looked to the proposed National Highway Program as still another challenge for the two industries.

A second enlightening talk on cement was given by Herbert G. Jahncke, Jahncke Service, Inc., New Orleans, La., entitled "Cement for Ready Mixed Concrete in 1956."

Reporting on a survey he made of 60 leading producers late in the year, Mr. Jahncke found that cement shortages were widespread in 1955; 90 percent of those replying were affected, he indicated. The most serious shortages occurred in the southwest and midwest and the least difficulties in the northwest, northern California, western Pennsylvania, and New York City. The shortages lasted from a few weeks up to 11 or 12 months, with lost production amounting to as high as 60,000 cu. yd. for one company; the total loss for the 60 firms was estimated at 600,000 cu. yd.

The speaker contended that one aspect of the shortage problem is that many cement companies do not look upon the ready mixed concrete market as a contractual one, in spite of the industry being the largest consumer of cement and its growth in importance each year. The survey findings indicated that there was no fixed pattern as to cement commitments made at the beginning of or during the year. Some firms did, however, work on fixed weekly allotments set up by the cement company; but this system isn't too good, he said, since it lacks the flexibility needed to accommodate fluctuating business demands brought on by such things as changing local weather conditions. Mr. Jahncke strongly recommended that the producer should no longer order cement from day to day as needed; rather, he said, the producer should not only anticipate his requirements, but should work closely with the cement suppliers, keeping them fully informed of what the requirements will be.

The survey also revealed that 9,000,000 bbl. of foreign and "out-of-area" cement (or 9 percent of total cement used by the industry) was purchased by the companies reporting.



Looking down one section of the exhibit showing some of the mixer and truck equipment

More than half of the companies used foreign cement, in quantities ranging as high as 300,000 bbl., and at an extra cost of from 54¢ to $3.50 per bbl.; and one half of the firms purchased "out-of-area" cement, at an extra cost of from 21¢ to $1.75 per bbl. Mr. Jahncke remarked that a great part of this extra cost had to be absorbed by the industry.

The survey revealed a note of optimism for 1956, based upon an estimated 20,000,000 additional bbl. of cement being available. If the industry receives its proportionate share, there will be about 7,000,000 bbl. additional cement available during the year. However, some producers reporting felt that this amount would still be insufficient and consequently looked for shortages in 1956.

The speaker concluded with a discussion of pricing and sales policy of cement suppliers. Because of increasing competition internally as well as from contractors setting up their own ready mix plants, many producers have to make firm commitments on jobs without price escalation, and often over long periods of time. In light of this, Mr. Jahncke feels that there should be more price security than is now offered. About one half of the companies surveyed reported increased cement prices in 1955, and in most cases the firms were notified only two weeks in advance. Because of this short notice, these companies had to absorb the increase for those job commitments extending over months. The speaker felt that this situation could be remedied by having cement prices guaranteed for at least a year in advance, and further that the increases should be made effective during the slack winter months. The other solution would be for ready mix producers to include price escalation clauses in their sales contracts; but unfortunately, this is impractical in highly competitive areas.

Mr. Jahncke heartily agreed with Mr. Baker, the earlier speaker, that the two industries continue to work as a team to promote the use of concrete. He lauded the cement industry in accepting its responsibility to meet the growing demand for cement.

Safety Awards

In the 1955 safety contest (covering the period July 1, 1954, to June 30, 1955), four classes of competition rather than three were recognized. Winners were as follows:

Class A — (companies producing more than 100,000 cu. yd.), Fischer Lime & Cement Co., Memphis, Tenn.;

Class B — (50,000 - 100,000 cu. yd.), Stewart and Nuss, Inc., Fresno, Calif.;

N.R.M.C.A. safety trophies for 1955 were accepted by, left to right: W. S. Walters, Fischer Lime & Cement Co., Memphis, Tenn.; Chas. W. Stewart, Stewart & Nuss, Inc.; Fresno, Calif.; Herschel T. Moon, Lake Cities Corp., East Chicago, Ind.; and Richard Longacre, Central Builders Supply Co., Sunbury, Penn.

Class C — (25,000 - 50,000 cu. yd.), Lake Cities Corp., East Chicago, Ind.; and

Class D — (less than 25,000 cu. yd.), Central Builders Supply Co., Sunbury, Penn.

Each winner received a *Pit & Quarry* safety trophy during the convention. The Class A and Class B winners were also winners in 1953.

For a list of companies having accident-free records during the contest period, see ROCK PRODUCTS, February, 1956, p. 194. These companies received Certificates of Achievement in Safety.

Strength Concrete

An informative paper, "If You Sell Concrete With Strength Guaranteed," by Director of Engineering Stanton Walker dealt with pitfalls and precautions with strength specifications where the user requires tests of specimens made in the field from samples taken from mixed concrete at delivery and which involve penalties.

If concrete is sold with strength guaranteed under such circumstances, Mr. Walker said that it is well for the producer to know:

"(1) What average strength will be secured, based on tests, for the proportions to be used and from, if you know, the cement that will be used; if you do not know, which is more likely, the average strength from the lowest testing cement available for use.

"(2) Based on your experience, what percentage of the strengths may be expected to fall below, say, 90 percent, 80 percent, and 70 percent of the average strength which is obtained.

"(3) Just what tolerances, if any, of low strength results are allowed in the strength specification which you guarantee to meet.

"(4) Just how much you need to over-design to be assured that the low strength which you *must expect* will not exceed the tolerances allowed. (If there are no tolerances stated or implied, you should not accept the work under any circumstances.)

"(5) And, of utmost importance, that you can depend on tests being made competently and strictly in accordance with standard procedures."

If a producer knows all the foregoing and applies that knowledge, Mr. Walker believes he may get by, barring the unforseen. Excess strength and excessive cement usually follow unless the specification is realistically drawn from the view of interpretation of strength results.

Strength specifications cause much uncertainty in estimating concrete costs, he said. The amount of cement can honestly be under-estimated, and supported by laboratory tests, and tolerances in strength and estimates of variations in strength may be and usually are underestimated. A strength specification, he said, presents serious problems of administration and it is therefore foolhardy for a producer to bid on strength specifications without a knowledge of the facts and application of that knowledge.

Variations in strength results, he reminded, are largely due to influences difficult of control rather to variations in the concrete itself. Among factors are temperature and other weather conditions at the time of sampling, errors in the taking of small samples, temperature effects on the samples and variables in the handling and curing in the laboratory, capping and testing.

Every strength specification should be examined thoroughly as to tolerances and penalties, he warned, and may involve supplementary understanding since they usually are not de-

fined. He said that the producer must understand the following:

"If you are an excellent operator with excellent testing facilities:

"(a) Fifty percent of your tests will be below the average of all (that is true, or substantially so, no matter how good or bad you are).

"(b) About 10 to 15 percent of your tests will fall below 90 percent of the average.

"(c) Some small percentage, say, 1, 2, 3 or 4, will fall below 80 percent of the average, and you are always faced with the likelihood of some one test showing almost anything.

"If you are "pretty good," a better than average operation, with excellent to good testing facilities, the probabilities are that:

"(a) Fifty percent of your tests will be below the average of all.

"(b) Fifteen to 20 percent, or maybe more, will fall below 90 percent of the average.

"(c) About 5 to 10 percent will fall below 80 percent of the average and perhaps as much as 1 percent below 70 percent.

"If you are a not-very-good operator with not-very-good testing facilities available, and you quote on a strength specification, let me suggest the use of rabbits feet or loaded dice as aggregates!"

Elements of a good specification which can reasonably be met by a good operator were stated as:

"1. Strength assumed as basis for design.

"2. Required average strength to be attained in the field—which may be the same as or higher than the design strength. The requirement of an over-design of 15 percent is not uncommon.

"3. Statement of tolerances for test results lower than the required average—and, of which, remember, there may be as many as 50 percent. I suggest that a tolerance of 15 percent of tests lower than 90 percent of the required average would not be too difficult. For example, if over-design were 15 percent that would permit 15 percent of tests lower than 103 percent of the design strength. A lesser tolerance would require a greater over-design. There should also be a tolerance at a lower level—say, 1 or 2 or 3 percent below 80 percent of the average."

Mr. Walker's objections lie in administrative difficulties rather than in a feeling that strength is not important. He advocates that it should be demonstrated in advance, by tests and otherwise, that the materials and proportions selected will furnish the desired concrete and then that these proportions should be adhered to until a change is ordered. He is convinced that strength specifications tend, more often than not, to give a less skillful competitor an advantage over the good operator rather than the reverse.

V. P. Ahearn, executive secretary of the associations, with **B. J. Ray,** Trumix Concrete, Leeds, England

Servicing—Quality

An excellent paper, "Now That the Job is Sold, What Are You Going to Do About It," by Edward J. Nunan, The Buffalo Slag Co., Inc., Buffalo, N. Y., emphasized the need for signed sales agreements or contracts to protect the producer, outlined important points to be included in such contracts, covered the desirability of adequate job servicing and stressed throughout the need for quality control.

Mr. Nunan started out by summarizing desirable points to be covered in sales contracts, on which the purchaser and producer must have full understanding. A good contract, he said, should spell out the terms and conditions of payment, and provide discounts, in order to secure prompt payment. It should limit deliveries to regular hours and work days at regular prices and provide for additional payment for other deliveries. Among other items, purchasers must agree to provide suitable roadways, the producer should be reimbursed for excess unloading time, protection should be provided against unforeseen price increases on cement and aggregates, and the producer be exempted from responsibiilty for the quality of concrete if water or any other material be added by the purchaser on the job at his request.

Mr. Nunan itemized these important points, to be clarified at the time the order is taken, by way of emphasis, reminding that they are covered thoroughly in the association's booklet "Standard Clauses for Sales Agreements in the Ready-Mixed Concrete Industry." He warned against the pitfalls of casual oral agreements.

Having sold the job, the next step is to understand the specifications exactly and to take steps so that they may be complied with in all respects. The association publications, "Control of Quality Ready Mixed Concrete" and "Specifications and Test Methods for Ready Mixed Concrete" were suggested for reading. Having someone in authority from the company make periodic personal calls on the job was advocated as of importance in creating better relations and resolving problems quickly.

In discussing the need for maintaining quality of product, Mr. Nunan reminded that ready-mixed concrete must be a superior product or the customer could job-mix his own product at any time. One of the failures is that producers permit too much importance to be placed on price at the expense of really selling the virtues of ready-mixed concrete.

Among challenges to be met are the highway departments and other purchasing agencies which do not yet fully accept ready-mixed concrete due to prejudice or some bad experience. Mr. Nunan enumerated some of the principal causes for bad results.

Lack of uniformity, often in a single load, is one of the most serious and frequent complaints and may be due to many things. Improper mixing was suggested as the most probable cause for lack of uniformity in an individual load. Improved results will follow, if mixing time be specified by drum revolutions rather than by time. When additional mixing water is required on the job, the drum is seldom revolved sufficiently to thoroughly mix the entire mass.

He then touched upon the problem of loss of slump when a mixer is held at the job after the mixing is completed, which loss of slump must be taken into account since it is the slump at time of delivery that determines compliance with specifications. Failure to make accurate measurement of all water was pointed to as probably accounting for the largest single source of complaint by users.

Mr. Nunan brought out some of the factors responsible for ruining good concrete on the job. Among them are the addition of excess water by jobforemen and improper curing. Should excess water be added at the insistence of the foremen, the drivers should have the amount entered on the ticket and have someone in authority sign the ticket. Failure by architects or engineers to follow A.S.T.M. specifications in listing requirements is another cause for complaints.

Mr. Nunan told at length what is being done in New York State through local associations effort to improve the quality of ready-mixed concrete. Three years ago the New York State Department of Public Works prohibited the use of transit-mixed

concrete on state work. Due to special efforts on the part of producers to meet this challenge, their product is now gaining acceptance.

Promoting Pavement Business

The new N.R.M.C.A.—P.C.A. Cooperative Street Promotion Program to promote the use of ready-mixed concrete for city street paving was discussed by Ross G. Wilcox of the Portland Cement Association. This long-range program is the result of conferences between the N.R.M.C.A. and the P.C.A. It is tailored to fit the recommendations of leaders in the ready-mixed concrete industry and was approved by the N.R.M.C.A. board of directors at its 1955 Fall meeting.

This field provides a new potential large market for ready-mixed concrete, looking ahead to the time when the industry along with the portland cement industry will be seeking new business. It is expected, according to Mr. Wilcox, that a minimum of two or three years will be required for the program to reach full effectiveness.

Close cooperation between producers and the district offices of P.C.A. is considered a natural tie-in, recognizing that the local producer because of his contacts and knowledge of local conditions is well qualified to round out the long-established promotional activities of the P.C.A. The P.C.A. has assigned a full-time man to plan and coordinate the activities which will be undertaken by the cooperating producers and the personnel of P.C.A.

Pilot studies are to be undertaken in a few selected cities in order to develop and improve procedures, after which the program will be extended into other cities. Spokane, Wash., St. Paul, Minn., and Akron, Ohio, were selected to start with and the fourth city will be Nashville, Tenn. In St. Paul, a tentative program of cooperative advertising has already been worked out between the P.C.A. district office and five producers, and a detailed economic analysis of concrete and competitive pavement types is being prepared. Work has also started in Akron.

Among some of the activities planned are the development of cost and life data for concrete and competitive materials, the preparation of news releases for local use, a well-rounded public relations program, the preparation of promotional literature, cooperative advertising, radio and TV advertising, and great emphasis on quality control in order that paving jobs gain high acceptance. The P.C.A. proposes to step up its inspection work and to work with local producers in developing a practical plan of inspection and quality control.

Merchandising Practices

A PANEL OF FOUR PRODUCERS led a lively discussion on merchandising practices in the ready-mixed concrete industry, each covering a specific phase of activity.

Quentin W. Best, Consolidated Rock Products Co., Los Angeles, Calif., covered the general subject of servicing the customer and scheduling deliveries. On all jobs in excess of 1000 cu. yd., his company's practice is for a salesman to visit the project with a service engineer to set up procedure in advance of the pour. Such visits are also made on any size of jobs where there is any point of dissatisfaction involving the contractor, on the theory that it costs much more to win back a customer than to hold him.

On jobs involving 10,000 cu. yd. or more, the transportation manager and yard superintendent also visit the job in advance in order that there be a clear understanding on all points. Written reports are then submitted to the general superintendent, dispatcher, service engineers, transportation manager, production manager and sales manager. Periodic calls are made on all jobs as a matter of practice.

Mr. Best's company is very thorough in scheduling deliveries for jobs in order to provide the utmost in service and for maximum utilization of its own delivery equipment. A suggested outline for discussion on "New Job Procedure" Conferences in use by the company was discussed and copies were made available.

Mr. Best briefly elaborated on each of the seven items in this outline. A thorough study has been made of travel time and it is known how long it takes to reach any point in normal or heavy traffic. It is important to know the unloading time in order to schedule trucks for each job. He told of an instance where this information permitted cutting down from 12 to seven trucks on one job. Early cancellations are highly desirable, so that other contractors may be serviced, and every effort is made to ascertain unloading times.

The qualifications and training of new sales personnel were discussed by F. Edwin Schouweiler, Old Fort Supply Co., Inc., Fort Wayne, Ind. This company is in the material supply business as well, which provides a proving ground for new salesmen.

Young engineers are preferred but it is considered more important that candidates have had some selling experience. They must be aggressive but not of the high pressure type. New salesmen are assigned to two or three years of inside work selling building materials before they call on customers. They attend the N.R.M.C.A. concrete school for two years and then are assigned a list of customers. This list contains a few of the better customer prospects so that the new salesman has an opportunity to get some business while developing new customers. He is credited with the business from his total list.

After a 6-month period, he is expected to get some business and by then it is known if he is qualified. After one year he is expected to show a return. An incentive is paid on the gross profit from his sales above a quota.

The value of clean plants and attractive rolling equipment as a merchandising asset was the subject of J. G. Goodner, The Dolese Co., Oklahoma City, Okla. He believes the industry generally has fallen down in maintaining good housekeeping practices and that too many operations are characterized by dust and dirt, mud, noise and shabby offices.

Mr. Goodner is a strong advocate of attractive, nicely painted trucks and he suggests that capital be made through publicity when new plants and equipment are installed and when new services, like two-way radio, become available. More use of attractively painted building signs was suggested.

Availability of aggregates was the topic of John B. Donovan, Valentine Concrete Co., Springfield, Mass. He talked about zoning in its restrictive effects on excavating sand and gravel and suggested that, in some areas, the ready-mixed concrete industry might in the future explore the possibilities of synthetic, lightweight aggregates.

Questions from the floor were pointed largely toward delays in unloading on the job and whether or not overtime penalties were being charged and collected. A western producer told how he uses a debit and credit system whereby the customer is penalized for undue delays and given a credit for early release of a truck below a set figure. The standard set is 4 min. per cu. yd. for 6-cu. yd. truck mixers. A figure of 10 cents per minute for over and under the set figure is used for the record. The customer signs the ticket and the records are kept for each day with invoices made daily. After a year or two, it has been found that the customer usually ends up with a credit.

A Texas producer told how he sold the customer on the idea that after 114

(Continued on page 244)

They're swapping minutes for dollars!

Worthington MIXERAMA proves on your job that a Hi-Up Mixer earns more for you!

You're looking at the unique new truck mixer demonstration that's got the Ready-Mix industry buzzing!

Hundreds of Ready-Mix men are finding out at MIXERAMA that no other truck mixer is in the same league with the Worthington Hi-Up. MIXERAMA is an eye-opening exhibition of Hi-Up performance — *and you see it at work right on your own job!*

Sure, we're proud of the Hi-Up Mixer. So proud, in fact, that we make a special point at MIXERAMA of letting you do just about anything to the Hi-Up that strikes your fancy. Try out the clutch . . . swing out (or on!) the sturdy discharge chute . . . climb *inside* the drum (of the Cutaway Mixer)— we want you to see for yourself just why we say the Hi-Up Mixer is your best buy . . . why no other mixer is in the same league when it comes to delivering *more uniformly mixed* concrete *faster!*

Tell your Worthington distributor you want to see MIXERAMA, with a Hi-Up loading at your plant and then delivering concrete to your current job. Or watch MIXERAMA in your area—your distributor will set up the date. It's the most convincing demonstration you've ever seen. And it's staged under operating conditions that *you* select . . . the tougher, the better! Call your Worthington distributor today and tell him you want to see MIXERAMA right away.

"MIXERAMA showed me how Hi-Up delivers better concrete faster!"

E. B. MC LENDON

North Carolina Ready-Mix Operator Says, "After a MIXERAMA demonstration I signed up for a Hi-Up"

Mr. E. B. McLendon, of B. H. McLendon Concrete Company of Albemarle, is strictly from Missouri when he's shopping for a concrete mixer. He's got to see for himself. And Worthington's MIXERAMA demonstration enabled him to do just that. Here's his enthusiastic report:

"Worthington MIXERAMA is the most convincing on-the-job exhibition of a concrete mixer I've ever seen in this business. Why, they even let me climb right inside the drum, and find out for myself how it's built."

Features that sold Mr. McLendon

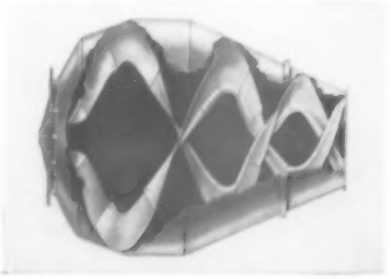
"What I especially liked about the Hi-Up is its heavy-duty transmission. It's the only one I've seen that's designed specifically for truck mixer operation. Our driver tells me the Hi-Up is unusually easy to handle and keep clean.

But the main reason I signed up on the spot is the way the Hi-Up mixes concrete so thoroughly and discharges it so fast—even a low-slump mix. After all, that's the pay-off—the ability to deliver *more uniformly mixed* concrete *faster.*"

See MIXERAMA soon

Make a date today to see Worthington MIXERAMA as soon as possible. Call your Worthington distributor. Worthington Corporation, Concrete Machinery Division, Section R.6.1B, Plainfield, New Jersey.

Mr. E. B. McLendon purchased this 5½ yard Hi-Up Mixer after seeing it in operation at a MIXERAMA demonstration.



Beating this drum is impossible! Drum and blades are made of abrasion-resistant steel. Blade design gives thorough mixing, fast discharge. Advanced water system for precision mixing.

MIXERAMA'S on the way to you!

WORTHINGTON

If It's a Concrete Job, It's a Hi-Up *Job*

Rock Drills • Wagon Drills • Pavers • Concrete Mixers • Portable Pumps • Portable Compressors

revolutions air-entraining concrete loses air and yield, resulting in loss of money to the customer and in harder-to-work concrete. Meetings with job superintendents and concrete finishers were the means of getting the facts across.

Another producer pointed out that delay charges were good for the customer because slow unloading actually hurts him most. Thus, such charges become an incentive for the contractor to improve his own efficiency.

On the subject of quality control, the concensus of opinion was that more and more technical knowledge is desirable, which requires laboratory facilities at the plant.

Two-Way Radio Communication

THE GROWING IMPORTANCE of two-way radio communication in the ready-mixed concrete and sand and gravel fields was emphasized in a joint session which featured a paper on "Eligibility Standards for Use of Industrial Radio" by Ernest W. Jennes, counsel for the associations, Washington, D. C., followed by a panel discussion of major radio users in the field. Panel members included Robert S. Barneyback, moderator; Wm. J. Hicklin, Jr., Capitol Concrete Co., Jacksonville, Fla.; Russell P. Mumford, Beckley & Myers Concrete Co., Springfield, Ohio; J. B. Sadler, Southern Materials Co., Inc., Richmond, Va.; and M. Eugene Sundt, Albuquerque Gravel Products Co., Albuquerque, N. M. Several producers in the audience also participated in the discussion.

Mr. Jennes reported that F.C.C. regulations promulgated in September, 1955, made industrial radio service available to:

1. Persons engaged in "delivering and pouring of ready-mixed concrete, hot asphalt mix, and similar perishable mixtures",

2. Persons engaged in mining, dredging or quarrying sand and gravel, and

3. Under certain conditions, persons engaged in crushing, washing, and grading of sand and gravel in preparation for its delivery.

On the negative side, the following serious restrictions were listed:

1. Industrial radio cannot be used in the *delivery* of sand and gravel *for sale*, regardless if there is a need for timing deliveries, etc.

2. An operator engaged in preparing sand and gravel for marketing (and not the mining of it), may use industrial radio *only* within the so-called "yard area."

3. With one exception, industrial radio cannot be used in standard metropolitan areas of 500,000 or more population. This restriction eliminates some 34 metropolitan areas which contain over 57,000,000 persons, he said. The exception, which was adopted recently, allows transmitting equipment to be used in an area of low population density removed from the urbanized sections of the plus 500,000 standard metropolitan area; however, the limitation is solely on transmitting signals, not on receiving them. This exception has allowed some operators in outlying areas of large cities to be eligible, the speaker said.

Mr. Jennes explained that these restrictions were imposed because of frequency congestion and interference problems. He said that there are already 60 groups of radio users, each having a certain allocation of the radio spectrum. Each group, he added, wants as many frequencies as possible for its own use. The industrial radio service, operating in the 152-162 mc. band, presently comprises about 10,000 stations.

For those firms ineligible for industrial radio service, Mr. Jennes suggested the use of the Citizens Radio Service, which is allocated the 460-470 mc. band of frequencies. This service involves the use of similar base station and mobile unit equipment as in the industrial service. Standards of eligibility are easy to meet—you must be an American citizen or your company must be owned by American citizens, and you must be unable to obtain a license for industrial radio for the use to which you want to put it. Another advantage is that with the exception of a few large cities like Chicago, Detriot, Los Angeles, etc., this band is being used to a limited extent, hence there is less interference. Also, he said, there is no population limitation.

Disadvantages of the Citizens service are present but not prohibitive, it was pointed out. These include:

1. Radio equipment is somewhat more costly (but this can be as little as ⅓).

2. Transmitting range is about 20 miles, compared to 40 to 50 miles for the lower frequency bands (but for many producers, this is sufficient, or where not sufficient, relay stations may be used).

3. In some mountainous and other areas, the effectiveness of the signal may be spotty and the range diminished (but this is not universally true).

4. Equipment has been somewhat more difficult to maintain (but this problem is rapidly being solved, he added).

Because these disadvantages are minor, the speaker felt that the Citizens service was a good solution to the problem. However, he considered it short term only, since with increasing usage imminent, this service may also become cluttered.

For long term solution to the problem, Mr. Jennes outlined certain factors which promise further success in the future; these concern split-channeling and making more efficient use of a number of frequencies which are presently assigned to the exclusive use of the petroleum and forest industries on a nationwide basis. Regarding the first factor, he pointed out that increasing technological developments are making it possible to (1) reduce the amount of protective space on either side of a designated frequency and (2) decrease the amount of space technically required by a single industrial radio station in order to transmit sound. Both developments would decrease the frequency separations, thereby increasing the number of channels available.

The second factor — non-use and waste of frequencies — relates to certain industries which have exclusive use of certain frequencies throughout the United States, yet the industries themselves are concentrated in certain

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Panel on Two-Way Radio Communication, left to right: E. W. Jennes, counsel for the associations; M. Eugene Sundt, Albuquerque Gravel Products Co.; Wm. J. Hicklin, Jr., Capitol Concrete Co., Jacksonville, Fla.; Robert S. Barneyback, Kaiser Co.; Joe B. Sadler, Southern Materials Co., Inc., Richmond, Va.; R. P. Mumford, Beckley & Myers Concrete Co., Springfield, Ohio

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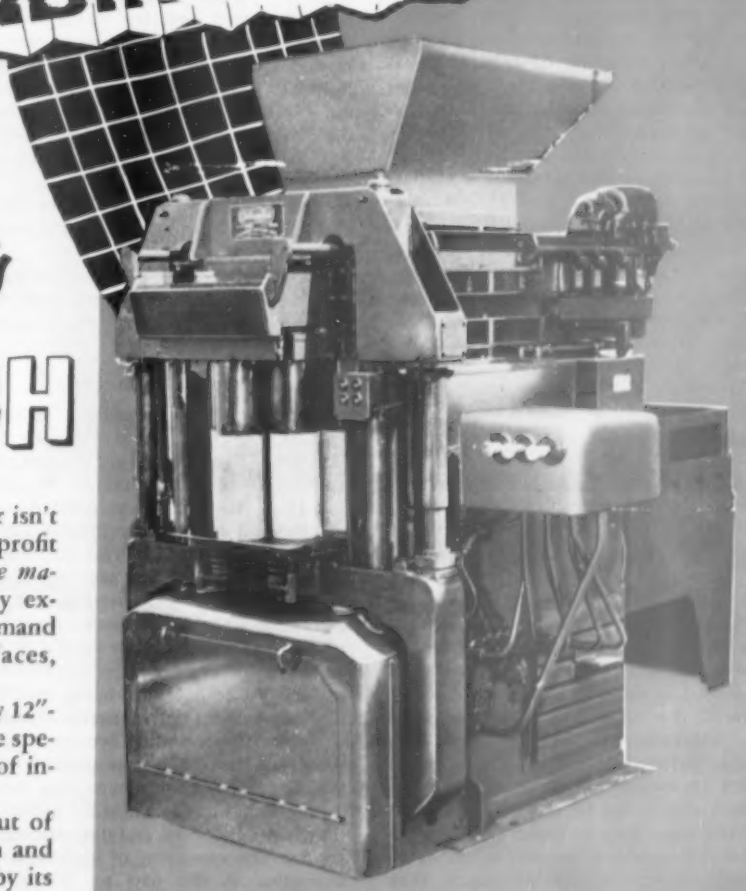

Today's progressive block maker isn't satisfied with a *fraction* of his profit potential. He's selling the *entire masonry market* . . . a market vastly expanded by an ever-increasing demand for concrete units in special faces, shapes and sizes.

With Columbia's revolutionary 12"-High you can enter this profitable specialty field with little expansion of investment or personnel.

Its precision, high-speed output of concrete building units in 8-inch and 4-inch heights is complemented by its unique ability to produce many 12"-high specialties: Drain tile, silo staves, water meter boxes, Roman and Norman tile, partition blocks, specially designed face block and others.

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. . . yet the cost of the 12"-High is less than many standard block machines. It gives the brick or block maker peak production for existing outlets PLUS access to almost unlimited new sales possibilities. For consistently larger profits, sell the *entire* market with a Columbia 12"-High.

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Ready Mix Production Problems

A "Clinic on Calculating Proportions for Concrete and Methods of Testing and Sampling" was well attended. The clinic was conducted by D. L. Bloem, assistant director of engineering; James F. Shook, and Richard D. Gaynor, associate and assistant research engineers, respectively, of the N.R.M.C.A.

The session was informal, and the subjects of sampling and testing concrete were discussed but only hitting the high spots. Students were advised that when sampling concrete, not to take the first, or the last, that came from the mixer as such material would not be representative. A stable base for a slump test was another caution. It was stressed that three cylinders per test should be made for any age, and that cardboard molds absorbed water and results might be erratic. Samples must be protected from excessive temperature and excessive evaporation. The cylinders should be properly cast and the machine load on them accurately applied. Freezing of a specimen during the first 8 hr. is bad, and if frozen after 24 hr., results are delayed. Testing in cardboard molds is not good practice and capping with Plaster of Paris was not advocated. Errors in testing give low results; seldom high. It was pointed out that more stress was being placed on flexural strengths.

During the discussions it was brought out that the Schmidt impact, or rebound hammer, gave results that bore a general relationship to the compressive strength of concrete and gave a general idea as to the merit of the material; it is not a quantitative measure.

Suggestions for more accurate testing included the following: Leadite for recapping compression test cylinders should not be used. Neat cement casts were easy to make and satisfactory. If cylinders are cast as far as 45 miles from the test laboratory, they should not be moved for at least 24 hr., and during the waiting period should be protected from evaporation.

W. T. McClenahan of the Chicago Sanitary District spoke to the group and stressed the necessity for uniform aggregate gradation, and segregation should be prevented. Field-cured cylinders, he said, gave erratic results until insulated boxes were made for the specimens, using wet sand with the assembly, thermostatically controlled. With this system, results are more uniform. Del Bloem said that cylinders must be tested wet; wet sand is a second rate substitute over lime water or plain water. It was pointed out that by the use of lime water no calcium salts are apt to leach out of the concrete but due to the low solubility of lime in water it was satisfactory to use plain water. When concrete sets, free lime is liberated and the water surrounding the specimen quickly becomes saturated (with lime) so that the leaching effect is not a factor. However, if running water is used around the specimens, the leaching effect can be detrimental. It was said the lime water and the moist room gave parallel results, and that membrane curing compounds may give low results. If the specimens were moist-cured for 24 hr., then the membrane curing compounds applied, this might give better results, but it was not recommended. In closing this part of the clinic, Stanton Walker said that "Responsibility rests on those who are responsible."

The remainder of the session was devoted to reviewing the methods of calculating various phases of concrete technique.

Flexural Strength of Concrete

"Effect of Aggregates and Other Factors on the Flexural Strength of Concrete," was the subject of a paper prepared jointly by Stanton Walker and D. L. Bloem. It was pointed out that flexural strength specifications for pavement, airport runways, etc., were of growing importance, and that until recently the tests were used mainly to determine when a pavement should be opened to traffic and they were easy to make. However, more recently beams, molded in the field, are being used to determine the relative merits of the concrete. Hence testing became a laboratory necessity. It was pointed out that flexural test specimens may have a differential in the moisture distribution in the specimen and this can affect results. The specifying of high flexural strengths, in the 650 to 700 p.s.i. range, has introduced new problems of concrete testing and control and the paper outlined in considerable detail many of these factors. Scope of the tests, testing procedures, and the effects of cement content, air entrainment, age, size of the coarse aggregate, brand of cement used, different coarse aggregates and size of the specimens were the high points of the paper.

By means of well prepared slides, it was shown that increasing the cement factor to very rich mixes did not always increase the flexural strength and this was particularly true when air entraining agents were added to concrete where the mix was above the 6 to 7-sack ratio (per cu. yd.). Other conclusions arrived at from the tests were as follows:

"Air entrainment caused increasingly large reductions in strength as richness of mix was increased. Penalties to compressive strength were greater than to flexural strength. A normal amount of air (4 to 5 percent) caused reductions in compressive strength ranging from nothing in very lean mixes to as much as 30 percent in rich mixes. The corresponding penalties to flexural strength were from nothing for lean to 15 percent for rich mixes.

"For standard curing, compressive strength was generally improved with age, at least up to one year. The improvement was greatest for rich mixtures where strength increased approximately in proportion to the logarithm of age. Continuous moist curing of the laboratory test specimens generally resulted in retrogression of measured flexural strength after 90 days and, in some cases, after 28 days.

"No advantage in strength was shown for maximum sizes greater than ¾ in. and, in the case of compressive strength, the 2½-in. aggregate showed a sharp decline. Harshness of mix and size of test specimen undoubtedly contributed to these results.

"Concrete strength, in both compression and flexure, was considerably affected by the use of different brands of cement. Even for the limited number of brands, representing a small geographical area, used in this investigation, strength differences of as much as 25 percent were observed.

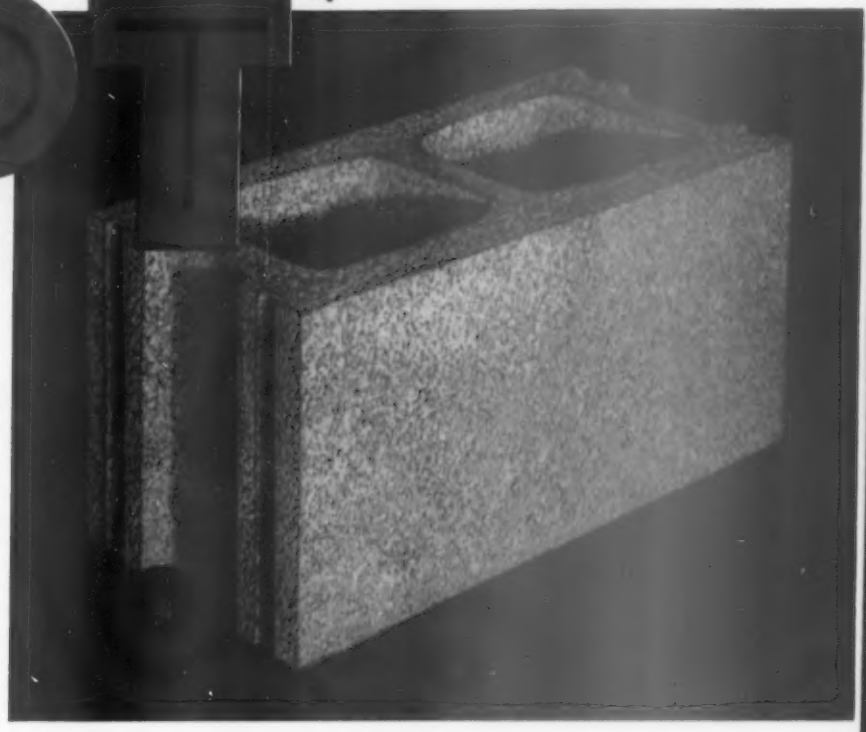
"Coarse aggregate also had a considerable effect on concrete strength. There was no evidence that compressive strength was significantly less affected by aggregate characteristics than was flexural strength. For both, the overall variation among 16 different aggregates amounted to approximately 20 percent.

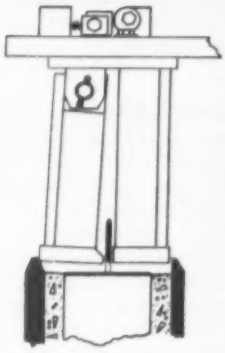
"Measured flexural strength was reduced and reproducibility of tests was improved as the cross-section of specimens was increased."

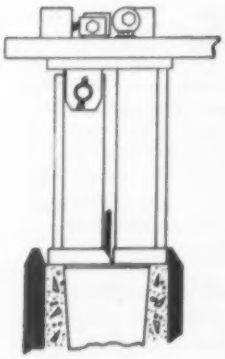
In the discussion that followed, it was pointed out that one crushed stone sample was used and 15 of gravel. Some of the gravel tested higher than the crushed stone, and some lower. The speaker said that one could not at this time, generalize on the aggregates and that each aggregate had to be considered as a separate identity. It was also pointed out that one cannot, at this time, translate compressive strengths into flexural, and that a 4000 p.s.i. compression test on concrete need not necessarily produce 650 p.s.i. flexural concrete. Factors that effect flexural strengths are the strength of the mortar itself, the strength of the

(Continued on page 248)

now BESSER gives you U.P.T.*







Upper drawing shows swinging stripper shoe contacting thick beveled division plate, ready to move to right — to contact stationary stripper shoe — to produce a block with U.P.T.

Lower drawing shows swinging stripper shoe—after clearing higher core plate — and contacting stationary shoe — ready to strip U.P.T. block.

FIRST IN PRODUCING A BUILDING BLOCK WITH UNI-PRESSED TOP*

Again Besser forges ahead with another FIRST in the Concrete Block Industry. This time it's U.P.T. . . . a block with *Uni-Pressed Top* . . . entire top surface made smooth. Note these new U.P.T. features:

- **Block has no machine marks, whatsoever.**
- **All six sides are now smooth.**
- **Concrete under core bar—packed the same density as rest of block.**
- **Higher division plate required, provides means for packing block edges better.**
- **Materially reduces grinding on floor filler units — as block is smooth.**
- **Makes perfect job of pressure grouting floor and roof planks — no weak points in center of block.**

U.P.T. attachments are available in 3 core, 2 core and floor & roof filler block. Get all the facts from your Besser representative, or write:

BESSER VIBRAPAC — the fully automatic concrete block machine. Produces high quality masonry units, of any desired texture and density, at the lowest possible cost.

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Speakers at meeting of state and association officials, left to right: R. E. Hutchins (Midwest); H. G. Feraud (Southern California); J. Revell Hopkins (Michigan); Claude L. Clark (Ohio); Ray L. Cain (Texas); E. R. Booker (Northern California); and Paul R. Smith (New York)

bond at the surface of the aggregate particles, and the strength of the aggregate itself. Surface texture of the particles might be an important factor, it was indicated.

Role of Calcium Sulphate

W. C. Hansen, director of research, Universal Atlas Cement Co., Buffington, Ind., told about "The Role of Calcium Sulphate in the Manufacture of Portland Cement." Gypsum, or calcium sulphate, the speaker pointed out, is about the only natural mineral that is available to act as a retarder in the setting of portland cement mixes. By means of slides, the reactions and end products formed in portland cement by the addition of gypsum were shown.

Cement Testing

Stanton Walker outlined the association's cement testing program. The paper was a progress report on a cement testing program which included testing samples from five sources; one sample from each every two weeks for a year, and to make parallel tests with a "standard sample" of cement prepared from a mixture of the association's laboratory cement. Tabulations No. 1 and 2 give some of the test results. The speaker used several slides to bring out his general theme.

Cooled Concrete

Harry Irwin, concrete engineer, Warner Co., Philadelphia, Penn., told about producing cooled concrete in his area. He pointed out that last summer temperatures there were high and that some green concrete poured was in the 80 to 90 deg. F. range. Extra water was added to concrete at these times but it did not affect the strengths as most of the excess evaporated. Cement used has a maximum temperature of 160 deg. F. By calculation, it was determined that reducing the temperature of the cement 30 deg. F., would reduce the temperature of the concrete only three degrees. The sand used had from 2 to 4 percent moisture in it. On some work they added crushed ice to the water used. As the work was on a trial basis at the outset, bagged ice was handled in 50-lb. sacks, and these were kept in a refrigerator truck nearby. The mixers were 6 and 6½-cu. yd. machines, and at the outset 650-lb. of ice was used per truck. Slump was harder to control, the speaker said, because of the ice melting factors; sometimes it did, and sometimes it did not melt in the 30 min. haul. At first 100 lb. of ice was used and this gave concrete temperatures at the job that were below requirements so the amount cut to 50 lb. but if conditions required it, 75 lb. was used per cu. yd. The average temperature of the mix at the plant was 72.3 deg. F. and at the job was 78 deg. F. and this was about 20 deg. below the ambient temperatures.

During the discussion it developed that no shrinkage cracks developed on jobs where ice was used but comparable strengths information was not available.

On the subject of added costs, it developed that the contractor paid one dollar per cubic yard extra for the ice cooled concrete; however, the actual costs at the plant were within that figure. It was said that on one job 36 tons of ice were used, and due to the method of handling the ice in bags 3 to 4 extra men were required. However, his company is investigating the cost of installing equipment to adequately cool the concrete and this may mean the cooling of the coarse aggregate.

Table 1: Sample-to-Sample Variations of Cement from a Given Source

Cement Source Number	Range in Strength of Samples from Same Source					
	3-day		7-day		28-day	
	p.s.i.	percent	p.s.i.	percent	p.s.i.	percent
1	266	11.1	349	9.8	259	5.1
2	793	36.1	835	25.8	817	17.7
3	194	9.9	351	11.2	358	7.3
4	529	27.9	548	22.3	545	16.2
5	417	16.1	472	11.9	736	13.8
6	545	34.0	722	29.2	766	18.6

Table 2: Strength Differences Among Cements from Different Sources

Sample Number	Range in Strength of Cements from Different Sources					
	3-day		7-day		28-day	
	p.s.i.	percent	p.s.i.	percent	p.s.i.	percent
1	1361	85.5	1726	69.9	1421	42.3
2	1113	59.0	1975	80.7	2596	75.4
3	1024	59.3	1420	53.8	2138	60.2
4	619	29.9	1206	40.3	2011	51.5
5	760	44.7	1547	61.1	2157	61.5
6	625	30.0	1221	44.8	1670	45.9

Association Elects Officers

The Unit Masonry Association of Metropolitan St. Louis has announced the election of Leo F. Havey as president of the association, succeeding T. W. Ryan, Alton Brick Co. Mr. Havey is also business manager of the Bricklayers, Masons and Plasterers International Union, Local No. 1 of St. Louis, Mo. Other officers are Bernard J. Loftus, mason contractor, vice-president; Robert W. Conradi, vice-president and general manager, Banner Sand & Materials Co., secretary; and David W. Sloss, mason contractor, treasurer. The association's membership includes union bricklayers, mason contractors, manufacturers and suppliers of brick, concrete block, stone, structural glazed tile, glass block, marble and ceramic tile; materials suppliers, equipment dealers and others in the masonry industry.

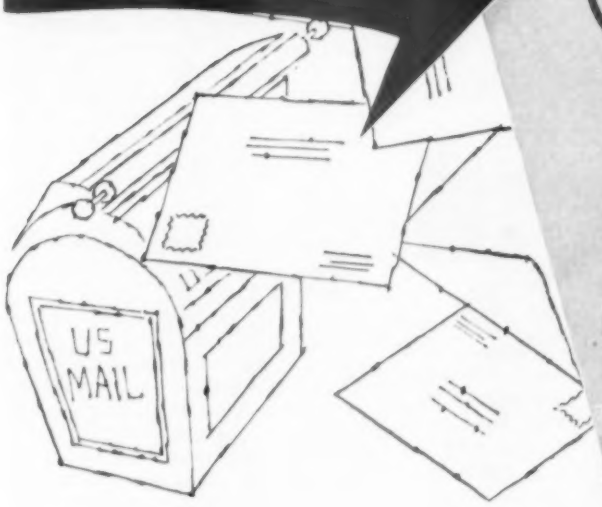
Uses Limestone in Concrete

Battle Creek Gravel Co., Battle Creek, Mich., is using limestone chips in place of gravel in the production of ready-mixed concrete. The use of limestone was necessitated due to depletion of the company's gravel deposit nearby. Monon Stone Co. supplies approximately 400 tons of crushed limestone to the plant daily.

Adds Prestressed Concrete

George Rackle & Sons Co., Cleveland, Ohio, has announced plans to produce prestressed concrete units. Ted J. Gutt, consulting engineer and designer, has been appointed assistant to the president, George L. Rackle, and will be in charge of the prestressed concrete operations.

An important NEW CATALOG for your files...



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Are you faced with rising costs and stiffer competition? How does your equipment compare with that of your competitors? It might be real smart—it might even be "profit-insurance"—to replace one or more of the truck mixers you now own with new Westinghouse Transit Mixer units!

The feature and fact-filled bulletin illustrated above tells the complete Westinghouse Transit Mixer story. It is a *must* for all profit-minded, ready mixed plant owners interested in that *Extra Profit Advantage* that comes from operating the best, most modern equipment.

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CP-564

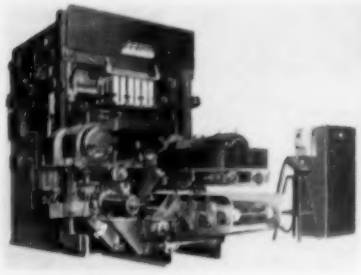
NEW MACHINERY

Truck Mixer

COOK BROS. EQUIPMENT CO., Los Angeles, Calif., has announced the addition of a 4½-cu. yd. model to the Challenge line of Pacemaker truck mixers, which is designed for mounting on light or medium tandem rear axle trucks. It features a center of gravity that puts more weight forward so the front axle of the truck carries a greater share of the load, thus permitting the use of a truck with a shorter wheelbase. Two-speed operation and $\frac{3}{16}$-in. Thoro Mix mixing blades are also incorporated in the unit. A Mixometer provides proper drum speeds for charging, mixing and discharging, and also records the total number of revolutions during the life of the mixer.

Lift Truck

HYSTER CO., 2902 N.E. Clackamas St., Portland 8, Ore., has announced a 20,000-lb. capacity lift truck with 24-in. load centers, designated the TC-200. It is patterned after the RC-SC lift truck series, and is powered by a Hercules industrial gasoline engine. The truck has a travel speed of more than 20 m.p.h. in either forward or reverse. Vacuum-powered brakes and center-point steering with an outside turning radius of 179 in. are incorporated for maneuverability. An overhead tilting mechanism and heavy-duty uprights provide maximum stability and rigidity under capacity loads. The lift truck has a comparatively short length of 166½ in., and a width of 94 in. for overall compactness. A wide number of Hyster and allied manufacture job attachments are available for the unit.

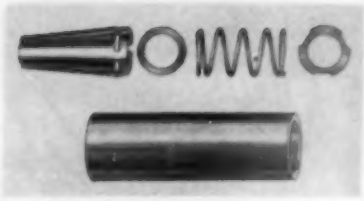


Block Machine

THE GENE OLSEN CORP., 407 Grace St., Adrian, Mich., has brought out the "Trustee" plain pallet block machine with a hydraulic drive and a conventional vibration system to accommodate various type molds without alteration. The unit can produce up to 1100 block per hour, depending on the aggregate. Large single acting cylinders are used throughout the hydraulic system, and the oil pump is large enough to supply an ample flow of oil without the use of accumulators. The remote control pushbutton station is a separate unit which may be located for maximum operator convenience, and the electric panel is in a separate housing. Other features include: 10-hp., plug reversing vibrator motors which eliminate the need for brakes; a variable cycle for maximum flexibility; heavy plate frame and cross bracing for frame rigidity; and automatic height and quality control.

Concrete Form Lubricant

ALOX CORP., 3962 Buffalo Ave., Niagara Falls, N.Y., has announced a concrete form lubricant, Alox 436, which, when added to kerosene or light petroleum oils, provides a release compound that prevents the sticking of concrete to molds or forms. It can be applied by brushing or spraying, and is said to provide a smooth finish to the concrete. It is also claimed not to darken or discolor concrete, never become rancid, and protect steel forms from rust and corrosion. It is available in 5, 15, 30 and 55 gal. containers, as well as tank car or bulk shipments. Approximately 20 gal. of lubricant can be made from 1 gal. of Alox 436.

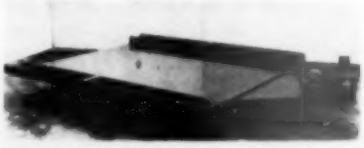


Re-Usable Anchor

RELIABLE ELECTRIC CO., 3145 Carroll Ave., Chicago 12, Ill., has introduced a re-usable anchor called Steelcase Strandvise, to hold steel rods or strands under tension during the manufacture of prestressed concrete. The anchor is said to anchor wires ranging from 150,000 to 290,000 p.s.i. at 4000 to 18,000 lb. tension.

Compression Testing Machine

TINIUS OLSEN TESTING MACHINE CO., 5117 Easton Rd., Willow Grove, Penn., has announced the portable Olsen compression testing machine for concrete block or cylinders. Weighing 285 lb., the machine has a capacity of 200,000 lb. compression load which is applied by hydraulic pressure developed by movement of a lever. The applied load is indicated directly on a large hydraulic gauge mounted on top of the unit. Made to accommodate standard 9- x 9- x 18-in. or 8- x 8- x 16-in. concrete block, the tester can also be used for testing standard 6- x 12-in. concrete cylinders.



Motor-Driven Turntable

COLUMBIA MACHINE WORKS, Vancouver, Wash., has brought out one, two and three-rack motor-driven turntables with automatic button-touch control for increased loading and unloading efficiency. The three-rack type expedites the exchange and cubing of block, as well as provides triple capacity. Racks may be loaded with green block in one position, while the second position is utilized for replacement of green block by cured units direct from the steam room. The two-rack turntable requires a minimum of space to duplicate the number of racks that may be used next to a machine. The main advantage of the single-rack type is increased efficiency in the cubing of block. The turntables are also available in manual, semi-portable and fixed position combinations to fit various type operations.

Noble-Mobile batching plant on wheels

gets job 21 miles from base and makes it pay...batches at job site with Noble-Mobile

Noble-Mobile at site of new Crown-Zellerbach plant, Antioch, Calif. 10" wheels dismounted for use on truck mixers. Supplier: H. W. "Heine" Gentry Co., Walnut Creek, Calif.

Hauled along highway like semi-trailer • Set up in one day—no field wiring, footings or crane time required on base plant • Aggregates charged with front end loader, crane or conveyor • Bulk cement utilized ...batched automatically • Excellent quality control Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour • Covered by patents pending

NOBLE BATCHING PLANTS
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Noble Company · 1860 · 7th St., Oakland 20, Calif. TEmplebar 2-5785

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Both these powerful, privately operated organizations continually challenge the barrage of Communist misstatements and false truths. Using saturation radio broadcasts and mass newspaper drops from message balloons, Radio Free Europe and Free Europe Press are constantly on the offensive against the Red campaign to annihilate right, reason and national pride.

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- ☐ Plan a paycheck stuffer to fully acquaint your employees with the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with your *Truth Dollars*.

For campaign material and information write **CRUSADE FOR FREEDOM,** 345 East 46th St., N. Y. C. 17.

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96" FULL COMFORT CAB

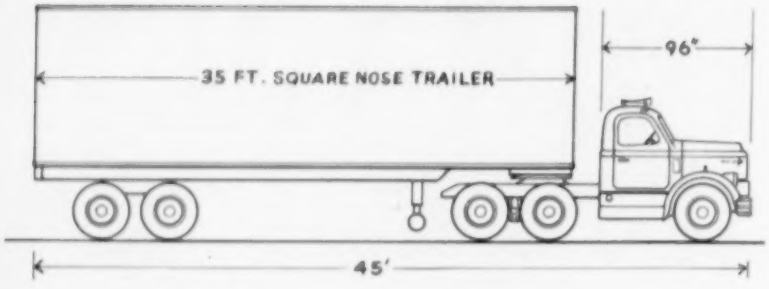
...at no premium price!

REO 96" A SERIES

with Cummins 175 h. p. JT-6B Turbodiesel

All the rugged engineering features of the *world's toughest trucks* plus exceptional maneuverability and roomy driver comfort of full-size conventional cab. *96" cab tractor pulls modern high-capacity square-nose trailers within 45' overall.* Tandem and single axles. All standard wheelbases for straight truck and truck-trailer uses, on or off highway. Models up to 48,000 G.V.W. or 62,000 G. C.W.

Reo A Series also in Gas or LPG Gold Comet short-stroke, wet-sleeve V-8s, 195—220 h.p.



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All the famous engineering and rugged-duty construction features of the *world's toughest trucks* in a highly maneuverable, easy-handling conventional style cab. Roomy comfort reduces driver fatigue. Smooth, low-vibration-level performance under extreme loads at high throttle.

Tandem and single axles. All standard wheelbases for straight truck and truck-trailer uses, on or off highway. Models up to 48,000 G.V.W. or 62,000 G.C.W.

Reo F Series also available with Gas or LPG Gold Comet Engines—short-stroke, wet-sleeve *sixes*—from 107 to 160 h.p.

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WORLD'S TOUGHEST TRUCK

Left: Filling vertical form with pumice concrete. Concrete is vibrated under pressure. Arrow points to 10-ft. high form. **Center:** Form being tipped to horizontal position. **Right:** With form in horizontal position, core pattern is now pushed out of concrete panel

Cast Cored Panels With Vertical Mold

By WALTER B. LENHART

• Switzer Panel Corp., Corona, Calif., mass producing cored panel units on semi-automatic machine

AT TWENTY-NINE PALMS, CALIF., a desert community made famous by a recent popular song, the marines operate an air base. To provide housing for military personnel and their families, some 500 homes were involved in the project. The U. S. Navy Engineers, after studying results of elaborate fire-resistance and other tests conducted by Prof. F. J. Converse, California Institute of Technology, selected a relatively new type of concrete panel as the basic building material for the project. The units are made on a semi-automatic machine developed by H. A. Van Loon, Bishop, Calif., and manufactured by O. J. Black Co. of the same city. The panel machine is licensed to users by the Van Loon Panel-Core Co., Bishop, Calif.

The Switzer Panel Corporation secured the contract for the Twenty-Nine Palms job and set up a plant at Corona. This contract alone involves some 50,000 full sized panels (or equivalents). In addition, a large number of units are being used on other projects within a radius of 150 miles of the plant.

The panels, which are 2 ft. wide, up to 10 ft. long, and 6 in. thick, have four full longitudinal cores 3¾-in. diameter with two half cores at the long edges. The panels weigh 26 lb. per sq. ft., and are made of pumice trucked to Corona from deposits owned and operated by Mr. Van Loon near Bishop. Two sizes of pumice are shipped; a ⅜ in. to ¼ in., and a minus ¼-in. material that contains some minus 200 mesh. The fines are said to have pozzolanic value.

Manufacturing Procedure

Aggregates are weighed in weigh batchers. After mixing, the concrete is moved by belt conveyor to the Van Loon panel machine. Two thousand pound concrete is specified but the operators consistently make 3000 p.s.i. concrete. High early-strength portland cement is used.

The Van Loon machine uses a steel mold that is filled in a vertical position with the concrete vibrated under pressure. After the vibration period, the form and its load is tipped forward to a horizontal position and the metal tubes forming the core-openings are removed. These tubes are tapered a fraction of an inch for the entire length to facilitate their removal. A panel is made on 2½-min. cycles with an average day's production being about 180 panels. The panels made of pumice are white in color.

Before placing the concrete in the vertical mold, thin steel liner plates are placed in the mold and these remain on both faces of the "green" concrete for 24 to 48 hr. During that time the panels are partially cured

Panels are cured in yard for two days before steel plates are removed

Handling cured panels at the cut-off saw

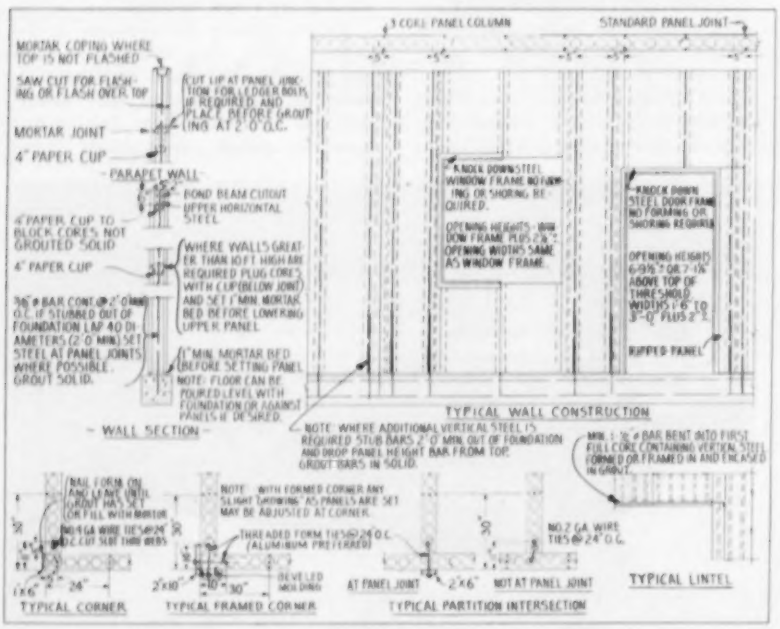
Trimming the edges of panel with saw

in outside atmosphere after which they are picked up by front-end lift trucks and delivered to the trimming saws where the ends are cut to specified lengths. The longitudinal corner edges are also trimmed at the same time. Trimming the long edges breaks up the monotony of a smooth flat wall when the panels are in place, and at the same time conceals the joints.

The saw used, furnished by Diamond Tool Associates, is made up with diamond inserts in a rim-like holder that fits over the main wheel. The tool is said to cut twice as fast as carborundum, and uses half the horsepower. The saw uses a 7½-hp. motor. Water is used when cutting. The machine cuts a slot that is from $\frac{1}{16}$-in. to 3/16-in. wide, depending on the diameter of the saw.

After the panels have been trimmed they are returned to the open air curing yard for a total of 28 days curing following which they are loaded on semi-trailers and shipped to place of use. Each semi-trailer tows its own Rinson front-end loader to and from the job. The front-end loaders are used to unload the units. The haul to Twenty-Nine Palms is a round trip of about 250 miles.

At the Corona operation, the Switzer Panel Corp. has seven front-end loaders; one Clark, one Hyster, two Scoopmobile and three Rinsons.


3 CORE PANEL COLUMN
STANDARD PANEL JOINT
MORTAR COPING WHERE TOP IS NOT FLASHED
SAW CUT FOR FLASHING OR FLASH OVER TOP
CUT UP AT PANEL JUNCTION FOR LEDGER BOLTS, IF REQUIRED, AND PLACE BEFORE GROUTING AT 2'-0" O.C.
MORTAR JOINT
4" PAPER CUP
PARAPET WALL
BOND BEAM CUTOUT UPPER HORIZONTAL STEEL
4" PAPER CUP TO BLOCK CORES NOT GROUTED SOLID
WHERE WALLS GREATER THAN 10FT HIGH ARE REQUIRED PLUG CORES WITH CUP (BELOW JOINT) AND SET 1" MIN. MORTAR BED BEFORE LOWERING UPPER PANEL
36" ø BAR CONT. @ 2'-0" O.C. IF STUBBED OUT OF FOUNDATION LAP 40 DIAMETERS (2'-0" MIN.) SET STEEL AT PANEL JOINTS WHERE POSSIBLE. GROUT SOLID.
1" MIN. MORTAR BED UNDER SETTING PANEL
NOTE: FLOOR CAN BE POURED LEVEL WITH FOUNDATION OR AGAINST PANELS IF DESIRED.
KNOCK DOWN STEEL WINDOW FRAME NO FORMING OR SHORING REQUIRED.
OPENING HEIGHTS 1000 DOW FRAME PLUS 2'-2" OPENING WIDTHS SAME AS WINDOW FRAME.
KNOCK DOWN STEEL DOOR FRAME NO FORMING OR SHORING REQUIRED
OPENING HEIGHTS 6-9½" OR 7-1½" ABOVE TOP OF THRESHOLD
WIDTHS 1'-6" TO 3'-0" PLUS 2"
RIBBED PANEL
TYPICAL WALL CONSTRUCTION
WALL SECTION
NOTE: WHERE ADDITIONAL VERTICAL STEEL IS REQUIRED STUB BARS 2'-0" MIN. OUT OF FOUNDATION AND DROP PANEL HEIGHT BAR FROM TOP. GROUT BARS IN SOLID.
MIN. 1 ½" ø BAR BENT INTO FIRST FULL CORE CONTAINING VERTICAL STEEL FORMED OR FRAMED IN AND ENCASED IN GROUT.
NAIL FORM ON AND LEAVE UNTIL GROUT HAS SET OR FILL WITH MORTAR
NO.9 GA WIRE TIES @ 24" O.C. CUT SLOT THRU WEBS
NOTE: WITH FORMED CORNER ANY SLIGHT THROWING AS PANELS ARE SET MAY BE ADJUSTED AT CORNER.
THREADED FORM TIES @ 24" O.C. (ALUMINUM PREFERRED)
NO.2 GA WIRE TIES @ 24" O.C.
BEVELED WEB ENDS
AT PANEL JOINT
2"x6" NOT AT PANEL JOINT
TYPICAL LINTEL
1'x6"
24"
2'x10"
10"
30"
TYPICAL CORNER
TYPICAL FRAMED CORNER
TYPICAL PARTITION INTERSECTION

Construction and installation details of concrete panel wall

The panels are placed in the wall by the use of a Bucyrus-Erie Hydrocrane. At one commercial building, a 13-ft. wall was placed at the rate of 2000 sq. ft. per 8 hr., using a 10-ft. panel and a 40-in. panel. Reinforcing steel is placed in the full core formed by the two half cores at the vertical edges after which the opening is filled with lightweight concrete. Two Diamond wheel saws, placed 2 in. apart, are used to saw two notches 6 in. deep in top of panel. These sections are cut out to permit placing a metal cup for grouting. This prevents the concrete from going down the core.

The panels permit the use of radiant heating in floors and walls and makes an attractive interior (and exterior) exposed masonry surface. The panels can be placed in the wall vertically or horizontally. They make excellent roof panels. Electrical wiring and plumbing can be placed in the cored sections with facility.

Pete Switzer is manager of the plant. Dick Branstetter is in charge of sales. Elmo Switzer is sales manager of building materials.

The Switzer Panel Corp., Corona, Calif., is an affiliate of the Transit Mix Concrete Co., Pasadena, Calif. The parent company operates eight ready-mixed concrete plants and one sand and gravel plant in southern California. Sand and gravel is also produced adjacent to the concrete panel operation at Corona. The parent company, which is also a producer of concrete masonry units, using two Besser block machines, has been in the concrete block business since 1945. At that time they started with a Flam machine. L. Glenn Switzer is president of the Transit Mix Concrete Co. and also of the Switzer Panel Corp.

Cut interference, save air time, multiply radio usefulness with new General Electric Personal Channel selective calling systems

New Progress Line Personal Channel Systems provide two-way radio users with individual calling, automatic recall or "leave a call"—make possible group calling with personal communication between dispatcher and driver after the call is placed.

Your two-way radio dispatcher can call or signal your drivers individually, with a new G-E Personal Channel selective calling system. He pre-selects the individual driver to be called or signalled by means of push buttons. Transmissions, with or without the electronic tones which provide the individual calling or signalling function, are made by pushing either of two push bars on a desk console.

With G-E Personal Channel individual calling built into two-way radio systems, dispatchers can call each driver—drivers need hear only calls beamed to them. Away from vehicles, drivers may automatically be recalled to the radio by a flashing light or sounding horn. If beyond range of the recall message, a signal automatically remains lighted on the radio control unit until the call is answered.

With a fleet equipped with Personal Channel group calling, drivers hear only calls from their own dispatcher. When the individual called answers the dispatcher, conversations then may become private.

New Progress Line Personal Channel Systems, for individual or group calling, effectively eliminate most of the nuisance interference due to crowded channel conditions. Both systems virtually eliminate bothersome "skip" interference from distant stations.

Present users of G-E all-electronic selective calling systems report increases up to one-third in useful air time. The ability to recall, or "leave a call", saves air time previously wasted when dispatchers repeated calls for drivers away from their vehicles.

NEW DEPENDABILITY

New G-E Personal Channel Selective Calling Systems now provide the highest possible reliability of operation. A new, simplified, electronic tone receiver selects proper tones in a more exacting manner than ever before. Limits within which the receiver will accept proper tones are dependent upon BOTH amplitude and frequency. The tones accepted must have the right amplitude as well as the right frequency.

Operating ranges of present two-way radio systems are not impaired by the addition of Personal Channel Selective Calling Systems.

All Personal Channel equipment can be incorporated within a single Progress Line mobile unit case, with the same cost-saving, interchangeable plug-in chassis feature provided in all Progress Line equipment.

Your General Electric Communications Counselor is ready now to recommend the G-E Personal Channel two-way radio system which will best serve you. For more information call him, or write: *General Electric Company, Communication Equipment, Section X4546, Electronics Park, Syracuse, New York.*

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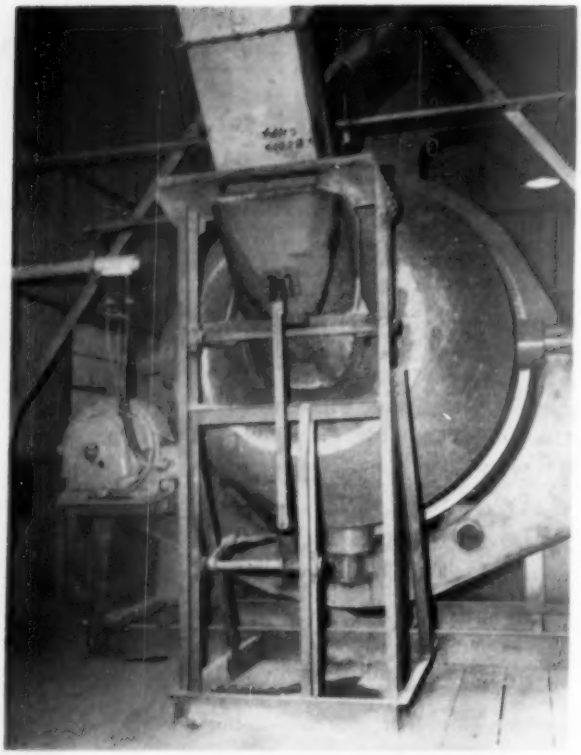
PLANT MAINTENANCE

40. A producer views the ready-mixed concrete business. This is the third article on plant maintenance

By JAS. A. NICHOLSON



A 6-cu. yd. tilting type mixer operated by Guaranteed Concrete Co. in one of its batching plants

THERE SEEMS TO BE A CONTINUING TREND toward central mixing. Producers who have been transit mixing mixing for years are beginning to install plant mixers in new facilities. In recent years, the operation and care of central mixers has become a maintenance problem of increasing importance.

A central plant mixer should be properly installed, efficiently operated, and carefully maintained.

When a new plant mixer is installed, erection people should follow manufacturer's instructions to the letter. Maintenance should start the minute the unit is unloaded from the railroad car. Before the equipment is installed, store the mixer where it won't get covered with cement or mud. If installation date is to be deferred, remove all air cylinder heads and pack cylinders with waterproof grease. If rust is permitted to accumulate on cylinder walls, the cup leathers will be cut to ribbons during early operation of the mixer. All pipe connections for water, air, or oil should be plugged or otherwise covered to prevent trouble from vandalism.

During installation, make certain that the mixer is leveled in all directions. Take care that everything is in alignment. If the mixer is a tilter, be extremely careful not to damage the gear or roller track when lowering the drum onto the tilter frame. Remove any grease, paint, or dirt that has accumulated on the roller track. Tell your mixer operator to be constantly on guard. Unless he keeps the roller track clean, flat spots on the rollers will soon develop. See to it that the linkage from the feed chute to the tilting frame is correctly adjusted so that the sealing ring on the bottom of the feed chute is in proper contact (just touching) with the ring on the drum opening.

If air is to be used to tilt the mixer, blow out all air lines before connecting them to air cylinders. If steam fitter cuttings are left in air lines, they will get into the cylinders, stick to the cup leathers, and eventually score the cylinder walls. In using air, don't try to operate a whole plant on one fixed air pressure. Mixer cylinders may take 110 lb., bin gate rams may need 70 lb., and cement aeration may require only 40 lb. For each use, provide the proper pressure and volume. A good setup is to keep the main tank pressure at 110 lb. and use reducing valves to adjust for other required pressures. Keep moisture and water out of the air cylinders by using a big air receiver (3- x 7-ft.).

There might be occasions where it would be (e.g., cost-wise or faster delivery) advantageous for a producer to buy the mixer motor from a local supplier. In such a case, it is extremely important that careful attention be given to mounting instructions so that the motor shafts and transmission shafts are in properly related positions. If plant layout permits droppings from the bin gates to fall downward on the mixer, provide a guard over the motor.

The matter of mixer maintenance should have received consideration when the new mixer was purchased. The original order should have called either for hardfacing the drum or the use of drum liners. The mixer blades should also have been hardfaced. If the blades aren't so protected, a beading of resistive material should be welded along the wearing edge even before the unit is placed in service.

Before operating the mixer, make certain that all bolts and nuts are securely tightened, drum is rotating in correct direction, and that the discharge valve is in proper working order. During one of our installations, a new mixer was almost tilted before the bolts and nuts were tightened down; on another occasion where faulty discharge operating equipment was furnished, we actually popped a very heavy mixer drum clear out of the tilting frame. Had it not been for a solid mixing floor, the drum would have been ruined and a new plant opening delayed several weeks. Much more important, an employe working underneath might have been seriously injured or killed.

The problem of drum direction is not quite so serious. In one make of tilting mixer, the rotation of the drum is upward on the pinion side. If a drum is rotating in the wrong direction, the only correction that must be made is to simply reverse the lead wires to the motor.

Safety Precautions

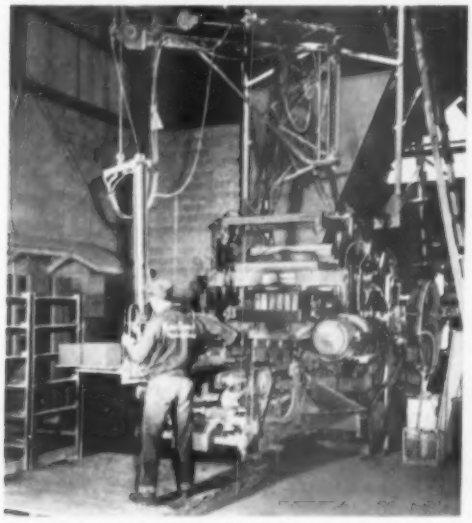
In installing a plant mixer, carefully read and follow manufacturer's instructions, make thorough checks on each move, and keep workmen out of

Pres., Nicholson Concrete Co., Toledo, Ohio.

Another BESSER Booster*

*This is the 128th of a series of ads featuring leaders of the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Maine Cement Products Company officials (left to right): John W. Peavey, Office Mgr., Joe A. Thomas, Plant Supt., Edwin F. Smith, V. P., and Jess Storey, President.



Besser Vibrapac in the Portland plant. Front Pallet Feed Model. Fully automatic. Off-bearer merely guides the power hoist for removing green block to racks.

Three Maine Block Plants are 100% Vibrapac Equipped!

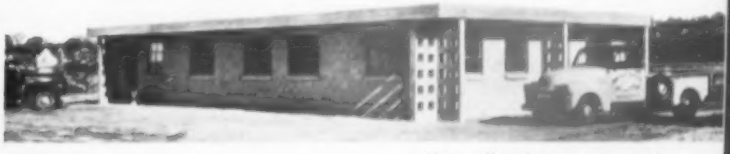
The Maine Cement Products Co., Inc. operates three concrete block plants — one at Portland, one at North Leeds and one at Bangor. All three plants are equipped with Besser Vibrapac machines.

Starting the manufacture of concrete block in 1949, the company chose Vibrapacs because of the long-lasting qualities of both the Vibrapacs and the end-product — Vibrapac block. In the words of President Storey, *"We consider Besser the only machine that can produce block to meet all specifications."*

Here is another example of a company that requires the finest and most dependable equipment to meet the ever-increasing demand for high quality block. And like so many other progressive block plants, they put their complete faith in Besser equipment.

BESSER COMPANY

BOX 135 • ALPENA, MICHIGAN, U. S. A.



Naturally, the company used Vibrapac Block for constructing their modern office building.

Portland yard and plant of the Maine Cement Products Co., Inc.

NATIONAL HOUSING CENTER EXHIBIT — Besser Company maintains a permanent exhibit of concrete masonry in the new National Housing Center, Washington, D. C. Be sure to visit this fine display when you are in the nation's capital.

First in Concrete Block Machines!

BESSER VIBRAPAC

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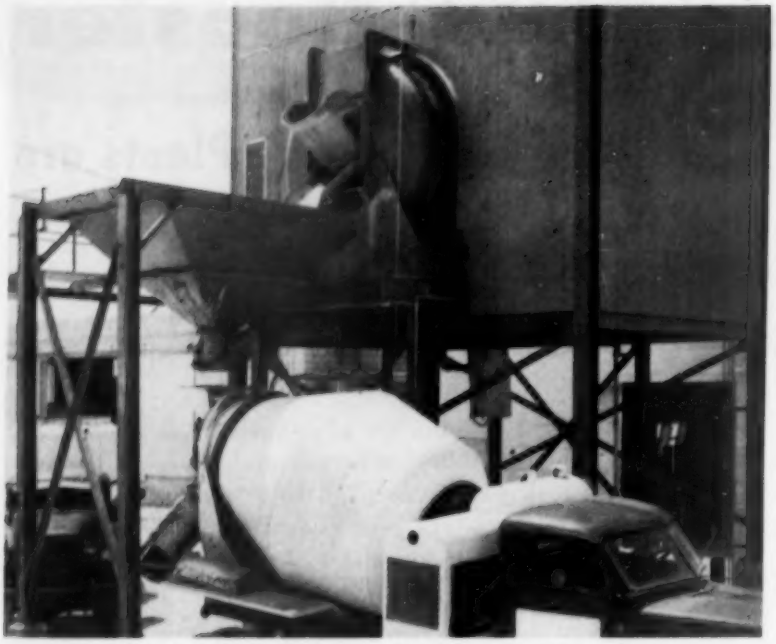

Typical of the non-tilting mixer operated by a ready-mixed concrete producer

danger zones. In installing, operating, or maintaining a central mixer, you are dealing with an expensive, heavy, sometimes dangerous, piece of equipment. For troublefree operation, pick a careful, efficient employe as the mixer man and insist that the mixer be given the best of care. Make sure that the mixer operator knows the instructions manual from cover to cover, and that operating and maintenance instructions are always carefully followed.

A plant mixer is a more efficient mixer than a truck mixer. Nevertheless, mixing action can be helped by following correct charging procedures. Aggregates and cement should be ribbon fed. Water should be so charged that it hits the drum in volume on the downward side of the mixer, getting under the aggregates and blending with the materials, thus helping to keep the mixer clean, as well as to give a faster mix. A mixer operator should be alert for other procedures that tend to prevent a buildup around the blades and throughout the drum.

A cleaner piece of equipment is easier to maintain. A clean machine will normally give less trouble than a dirty unit. When repairs are required, time will be saved if dirt, excess grease, hardened cement, etc. don't first have to be removed before the actual maintenance work is started. A dirty machine is a sure sign of a careless operator. The chances are that a dirty machine is being abused in other ways. In the care of a central mixer, these general remarks apply with special significance.

A plant mixer should be kept clean inside and out. Frequent applications of a light paraffin oil film on both ends of the central mixer will help to keep the exterior clean. Any buildup on the drum interior occuring during a day's operation should be completely removed before the plant is closed down. Discussion of daily efficient cleaning routines brings to mind the problem of spillage from the central mixer, resulting in concrete-splattered mixer trucks.

Producers experience spillage when they try to get maximum mixer loads, or the mixer handles high slump concrete. We have been able to eliminate spillage trouble by building a 2½-in. to 3-in. circular baffle just inside the drum around the opening at both ends. The baffle keeps concrete from climbing up the wall of the drum and falling outside. As concrete hits the circular baffle, it folds over and falls back into the drum. We have successfully used baffles of this general description in several makes of plant mixers.

In a central mixer which is charged in the rear end and tilted forward to discharge, we have found that a revolving door supported by arms from an exterior frame can be laid up against the discharge opening of the revolving drum to practically eliminate the dust problem that always occurs at the beginning of the mixing action with the introduction of materials into the mixer. If properly constructed, this revolving door will solve the spillage problem at that end of the mixer and will throw the cement dust to the back end of the mixer where lines connected with a suction fan will pick up the dust and discharge it to a point outside the mixing plant. Some operations are equipped with a dust collector system that returns the very fine, air borne cement to storage bins.

At the minimum, a mixer should be lubricated as frequently as recommended by the manufacturer. If the mixer is equipped with an automatic lubricator for the valves and cylinders, there should always be sufficient oil in the sight bowl whenever the mixer is being operated. Oils and greases equivalent or superior to manufacturer's recommendations should be used; (e.g., in the care of one mixer that we use, it is recommended that Crater 2X Fluid or its equivalent be used on drum gear and pinion to keep both well coated at all times.) Any suggested changes in lubricants involving seasons or temperatures should be followed. Whenever a manufacturer recommends daily lubrication, that is a must for the mixer operator; where the recommendation calls for a weekly lubrication, we tell the operator to give a little shot every day. We also tell the operator to inspect as he greases. Alertness avoids downtime.

As the mixer is being cleaned or lubricated, the drum and mixing blades should be checked for wear, as also the condition of the support braces. Special hard plate non-abrasive, long-wearing material should be used in rebuilding blades. We always hardface the blade and use liners to protect the drum. Although our equipment superintendent keeps a record over major repairs and overhauls, our maintenance people have made a practice of welding a bead on the side of a mixer indicating when a liner job was completed. The condition of the big drum gear should be regularly checked. If the drum pinion is allowed to get too tight or go beyond the pitch line, it will have a tendency to gouge out the teeth in the gear. This is a costly mishap. Leading manufacturers provide a means of adjustment for a proper setting of the gear and pinion. As wear occurs, adjustment of the guide rollers will be required. Guide posts should be used to properly set rollers.

In some mixing plants, care of tilting equipment becomes an added maintenance problem. Where air is used, there is generally little to go wrong. If air leaks start, packing in air cylinders should be tightened or replaced. Some additional care is required in the case of a hydraulic unit. A proper level must be maintained in the oil tank. Broken lines must be replaced; oil leaks eliminated. A slowing up of the tilting operation is generally indicative of a worn or improp-

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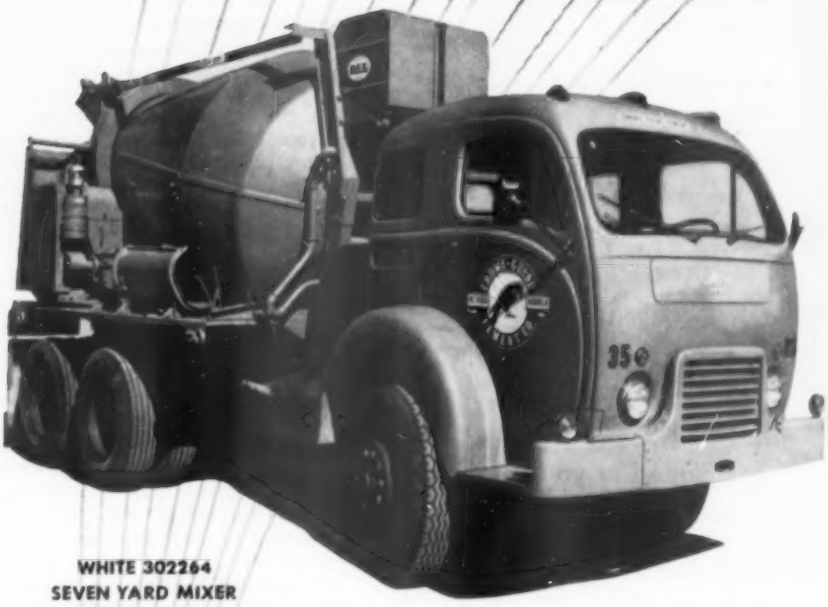

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WHITE 3016
CONCRETE BLOCKS

Has 145½-inch wheelbase, 15 ft. flatbed with automatic loading for concrete blocks. 106C rear axle with 6.80 to 1 ratio.

WHITE TRACTOR
40 FOOT FLOAT

White WC 22PLT has 142-inch wheelbase, 329C rear axle with 5.57-7.60 ratio. 40 ft. float semi-trailer for hauling concrete blocks.

WHITE TRACTOR
30 FOOT FLOAT

This White tractor has 140-inch wheelbase, 306C rear axle, 30 foot float semi-trailer with automatic concrete block loader.

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erly functioning hydraulic pump. Corrections should be made before you get caught with a load in the mixer.

As indicated in the preceding paragraphs, our company's experience with plant mixers has been limited entirely to work with units of the tilting type. I have discussed operation of non-tilting plant mixers with several producers using this type of equipment. On operations and care of stationary mixers, R. E. Ochsenhirt of the Botzum Bros. Co., Akron, Ohio and V. H. Berg, Worthington Corporation, have been principal sources of information for me.

Non-Tilting Mixers

Manufacturers of stationary type plant mixers stress the importance of proper installation. They point out the necessity that the mixer be set on the level and insist that all the hold down bolts be securely tightened. Mixer suppliers tell the producers that unless these requirements are met, drum tires will press against the roller flanges, causing rapid wear on the rollers and elsewhere. The main frame level and the mixer hold-down bolts are to be checked regularly.

As with tilting mixers, charging sequence of materials is of great importance. Sufficient water should first be introduced into the drum to wet the drum liners. The water should run continuously while the materials are being ribbon fed into the mixer, cement charging should be completed before the aggregates are all in the drum, and the charging cycle should be completed with a small amount of water to clean up behind the rest of the materials.

The general maintenance problems of producers who use horizontal mixers seem to be approximately the same as those that I have described for users of tilting mixers. In most cases, similar attention is required. Certain services must be performed regularly — some (cleaning and lubricating) daily; others, at greater intervals. It is a general practice to spray the drum daily with form oil and coat the trunnion tracks with a heavy plastic grease to cushion the rollers. Coating the track is one practice that differs from maintenance procedures used in the the care of tilting mixers. This coating enables the horizontal drum to float on the rollers.

The wisdom of hardfacing the mixing blades (wearing edges) and the drum liners is confirmed by all producers. Some operators say that hardfacing doubles the life of liners and blades. Users of horizontal mixers have another hardfacing problem. Unless properly protected, the discharge chutes will show rapid wear. R. E.

Ochsenhirt reported that by hardfacing 80 percent of the discharge chute area, his company was able to almost triple the life of the chute.

Stationary mixer operators find it pays to introduce flush water into the drum whenever there are to be long waits between trucks. This is also a good warm weather practice in tilter operation. Horizontal mixer operators also find it pays to drain and flush the hydraulic system every 60 days and to carefully check the "V" belts at the same time. All point out the wisdom of making seasonal adjustments in lubrication practices, both in frequency of lubrications and types of oil being used. All stress the importance of winter (or other slow period) overhauling. The Botzum company has an electrician go completely over the electronic system, replacing points, checking coils, etc. Any replacement of mixer parts is done during this same downtime period.

Even though no serious mixer breakdown has been experienced, good operators keep, in stock, replacement parts that will help to get a plant quickly back into operation. In determining an adequate parts inventory, most producers agree that it is good business to follow manufacturer's recommendations. As plant equipment gets older, producers learn (sometimes the hard way) that a larger parts inventory must be maintained.

A principal reason for going to the added expense of central mixing is to improve the quality of the delivered concrete. A quality minded producer insists upon an efficient mixer operator, adequate mixing time, avoidance of overloading and freedom from breakdown through proper care. The ingredients of proper mixer care are daily cleaning, systematic lubrication, frequent checking, and the regular performance of other preventive maintenance services.

PRESTRESSED UNITS

(Continued from page 236)

The pile manufacturing process required an earth-moist mix. No admixture of any kind was used in this concrete. It was found that the sections came out better if this concrete was made as wet as possible consistent with the spinning operation, this still being an earth-moist condition best determined by eye. Once determined, the amount of water was controlled by a volume batcher. In order to be sure of adequate strength at the time of stressing and driving, the cement content was increased from six to seven sacks per cubic yard.

Test cylinders, $3\frac{3}{16}$ in. in diameter by 6⅜ in. long were made on a vibrating table using a combination of vibra-

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ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

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Perhaps you'd like some specific information on what MARCO Idlers can do for you. That's easy. Just request a free copy of bulletin ID-2, today. It tells you about the complete line.

MARCO Model 151 Standard Tubular Frame Conveyor charging dry batch bin in ready mix operation.

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NR Plastic

1 TABLESPOON OF DRY POWDER Per Bag of Cement Produces
Greater Plasticity
IN THE GREEN UNIT Plus
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COST—1/3¢ per Bag of Cement!

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KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

tion and pressure. They were put through the curing cycle with the pile sections.

The engineer employs a regular staff of inspectors on the job, all materials and operations relative to the finished structure being subject to inspection and control. A complete testing laboratory is maintained on the project by Southern Laboratories, Inc., testing affiliate of the engineer. Laboratory control is exercised over all materials entering the finished structure.

Ohio Ready Mix Meeting

THERE WERE 218 PRESENT at the annual breakfast meeting of the Ohio Ready Mixed Concrete Association held during the N.R.M.C.A. convention, including 18 guests of whom 13 were association secretaries from state and area associations. This was 57 more than ever before.

The Ohio association now has 138 active members as compared to 100 two years ago, and has 35 associate members, reflecting the great service of the association to its members.

President Charles O. Dittrich presided and introduced many of the guests including Louis C. Schilling, president of N.R.M.C.A.

R. P. Mumford, chairman of the short course committee, reported on the fifth annual short course January 16-18 at the University of Akron which had 166 registrants. The next one will be held January 14-16 at the University of Dayton.

Chairman James A. Nicholson of the policy committee stressed the need for an increase in dues so that the association will be better prepared for enlarged activities in the field of labor relations, public relations and other pressing problems. Mr. Nicholson paid high praise to secretary Claude Clark for his conduct of association affairs.

H. G. Feraud, of the Southern California Ready Mixed Concrete Association, was the guest speaker. Much of his talk was about the Los Angeles strike of the industries, the organization of his associations for labor negotiations and how they functioned.

The associations had a large reserve in funds at the time of the strike of which some $60,000 was spent. Mr. Feraud said that money spent for good attorneys in such situations has proved to be well spent, and he advocates that all associations of the industry have a sufficient scale of dues to build a surplus for such emergencies when the large unions' actions will require a united front on the part of small industries. The Association's 1956 annual meeting will be held June 19-20 at Hotel Hollenden, Cleveland, Ohio.

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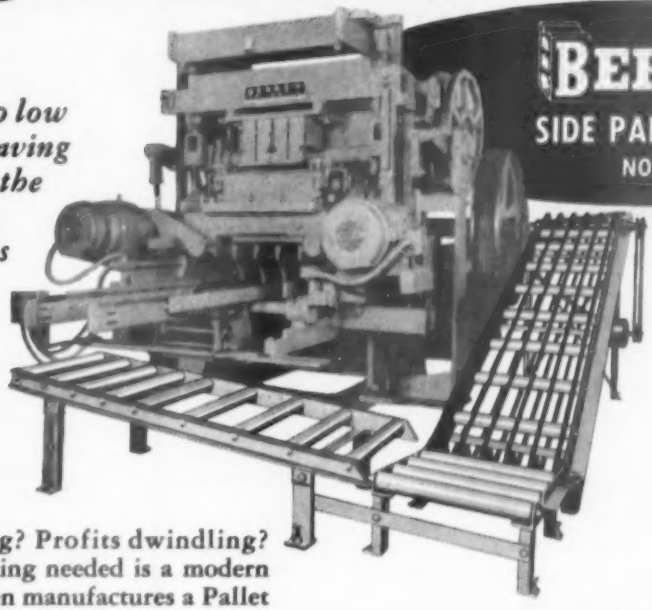
Budget-priced so low that labor-cost saving can easily repay the investment in as little as 5 months



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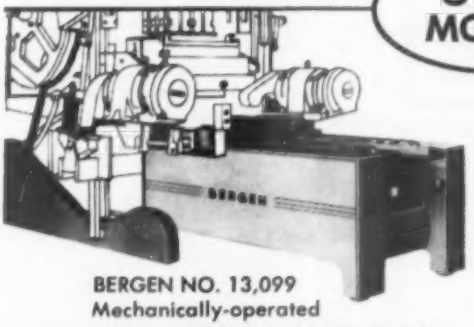
SIDE PALLET FEEDER
NO. 13,000

Production lagging? Profits dwindling? Perhaps the only thing needed is a modern Pallet Feeder. Bergen manufactures a Pallet Feeder to meet every need. Many block plant owners who prefer a side pallet feeder will find all the requirements of high efficiency and economy in the Bergen Side Pallet Feeder.

Here are some of the features!

- Low initial cost
- Simple, trouble-free operation
- Finest quality ball-bearing rollers used throughout
- Individual, long-life V-belt conveyor
- Adjustable legs offer a variety of height positions
- Easily installed . . . no major alterations necessary
- Quickly detached to facilitate block machine repairs or cleaning

OTHER MODELS



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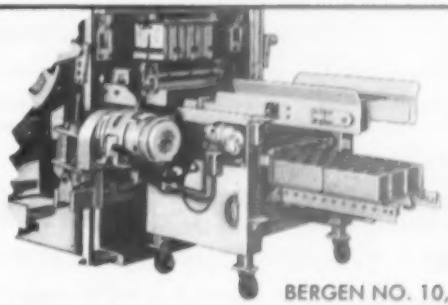
Underneath FRONT PALLET FEEDER



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or to supplement large equipment

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A push button starts the cycle during which operations occur automatically in sequence.

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Equal delivery of aggregate to the mold box is effected by agitation and mold box vibration assures uniform block density.

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A SPECIAL air cylinder-powered press head speeds the cycle and assures blocks of uniform height.

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Consistently produces blocks at a rate of 5 or more per minute from any aggregate.

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Priced below any machine of comparable performance.

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Write today for complete information and learn how easily you can improve your situation with the addition of this unusually simple, compact and efficient machine.

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ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

TWO-WAY RADIO

(Continued from page 244)

regions only. Consequently, in many areas, these frequencies are not being used. Another example cited was the frequency modulation band; some 20,000 kc. of space was allocated in order to accommodate as many as 5000 stations, yet only 550 FM stations have been built.

An additional encouraging factor cited by Mr. Jennes is that there are indications that the F.C.C. is becoming increasingly interested in the problems of business radio use. In releasing the so called final rules last September, the Commission indicated that they were intended only as an *interim* measure, and that further it hoped to be able to expand industrial radio usage in the future.

In conclusion, Mr. Jennes urged the industry to continue pleading its case for wider radio usage; this will involve the allocation of more of the radio spectrum for business uses, eliminating the discrimination against distribution and servicing industries, and discarding the arbitrary 500,000 population limitation. He emphasized that the problem is a difficult one, since there are so many competing and conflicting pressures.

Panel Discussion

Among the various subjects discussed by the panel on two-way radio, costs of equipment and operation, leased vs. purchased equipment, radio range, and advantages of use of radio received the most attention. Approximate initial costs were reported as follows: base station, $1000; tower and antenna, $500; and individual truck radio, $450 plus $25 installation cost. Mr. Sundt, who operates over 50 radio-equipped trucks in Albuquerque, stated that monthly maintenance costs per unit averaged $7.50 ($1.25 for parts and $6.25 for labor). He recommended that maintenance work be handled by a professional radio repair expert rather than a home radio repair man, since the highly precision equipment is expensive. It is also advisable for the repair man to work at the plant, so that the truck would be tied up only a minimum of time.

In answering a question as to savings, Mr. Hicklin figured that a radio-equipped ready mix truck costs an extra $20 per month or $1 per day to operate, (figuring 20 working days per month). This figure was based on $7 for maintenance labor and parts, and $13 for depreciation (taken over a 3-year period). Figuring operating costs of a mixer truck at $6 per hour, a saving of only 10 min. per day

(Continued on page 270)

BIG VOLUME GRINDING at Low Cost

Ideal For Aggregate Grinding

- Delivers up to 30 yards per hour.
- Handles material wet or dry.
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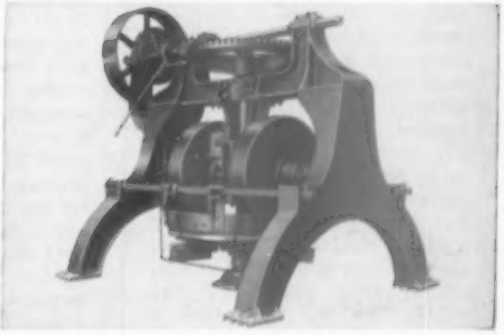
Huber-Warco Grinders range in capacity from 4 to 75 yards per hour. Whatever your capacity requirement, there's a Huber-Warco Grinder exactly suited to your type of aggregate. Ask for a non-obligating consultation with the Huber-Warco grinding specialist . . . write, wire or phone.



HUBER-WARCO NO. 9 GRINDER

This 30 yard per hour capacity grinder has been designed to give big-volume aggregate production with a minimum of grinding costs. The suspended yoke mounted mullers are adjustable to any height, and for finer grinding, the grinding surfaces run together.

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MARION, OHIO, U. S. A.

Road Machinery

CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

COMMENT
from the
BUTLER ENGINEER
Of Meat-loaf, Bourbon and Automatic Firsts

A bigger "whew" than ever this year after riding the whirling carrousels of the

A. E. D.
Ready Mixed Concrete meeting
National Concrete Masonry and the
National Sand and Gravel conventions.

Wonderful to see our old friends and meet so many new ones. I am however, coining a new name for the festivities — the "meat-loaf-and-bourbon-circuit".

Your Butler Engineer came back from them all with two more pieces of luggage than he took . . . a bag under each eye.

•

Terrifically successful though—every one of 'em. And I'm tickled a rich, rosy pink at the reception given our exhibits. We showed automatic batching equipment — all hooked up and working.

Mighty, mighty interesting what has happened in the concrete batching field. Only a short time ago when we processed orders for batchers it was assumed that unless otherwise marked, they were to be manually controlled. Today it's the other way 'round. Orders are assumed to be for *automatic* batchers unless definitely marked "MANUAL". And these are as scarce as Model T Fords. About four years ago the Butler organization took a good, long look deep into our pet crystal ball. In it we saw the words, "Automation is coming! Get ready". The good old c. b. never fails. Result? Butler was in the field first with the best — from one man operated Roadbuilders Plants to punched-card controls for the Ready Mixed Industry.

Stay healthy,

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

would cover the added daily radio cost. He indicated that well over 10 min. are saved each day through use of radio.

Mr. Mumford, who leases radios from the telephone company, reported that the monthly rental cost of the base station is $39.50, and each truck radio, $15, with an initial installation charge of $50. Advantages of leasing equipment, he cited, include no initial investment, no maintenance costs (the lessor handles maintenance), and during the winter shut down, the equipment is idled and thus not charged for. It was reported that rental costs per truck radio were much higher elsewhere, being $21 and $25 per month in New Mexico and Florida, respectively. This makes leasing undesirable in those areas.

It was also brought out that leasing of radios by the telephone companies will be stopped within five years, as a result of a recent anti-trust ruling against A.T. & T.

Indicative of the value of two-way radio was the comment of one panelist that "there is no substitute unless you believe that time has no value." Another speaker, who now has his entire fleet equipped with radio, reported that in his area the customers request radio-controlled deliveries over standard deliveries, and that his competitor has just begun converting to industrial radio to meet the competition.

In discussing radio range, Mr. Sundt emphasized the importance of selecting the best site for the base station. In his case, the (50 mc.) base station was relocated on higher ground and away from an electric power line, resulting in much improved transmission; in fact, in one direction the range is about 75 miles. The speaker indicated that the radio supplier will run preliminary tests to select the best site for the station. One producer operating in hilly country pointed out that the Citizens band yielded better transmission than the special industrial service band; he added that the hilly terrain necessitated building a radio tower 168 ft. high.

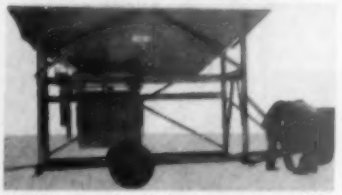
Mr. Sadler discussed the use of radio in his company's amphibious-sand and gravel operations on the James River, where radio has proved invaluable in integrating the plant operations with movement of barges. On the larger vessels, the company uses three radio channels — ship-to-ship, ship-to-shore, and coast guard (for emergency).

•

DAVID M. HUMPHREY, formerly with Master Builders Co., Cleveland, Ohio, has been appointed general manager of the Warren Septic Tank Co., Warren, Ohio.

HERE'S A PORTABLE SMALL PLANT TO CUT LONG HAULS

A CIMCO plant and conveyor batch truck mixers.



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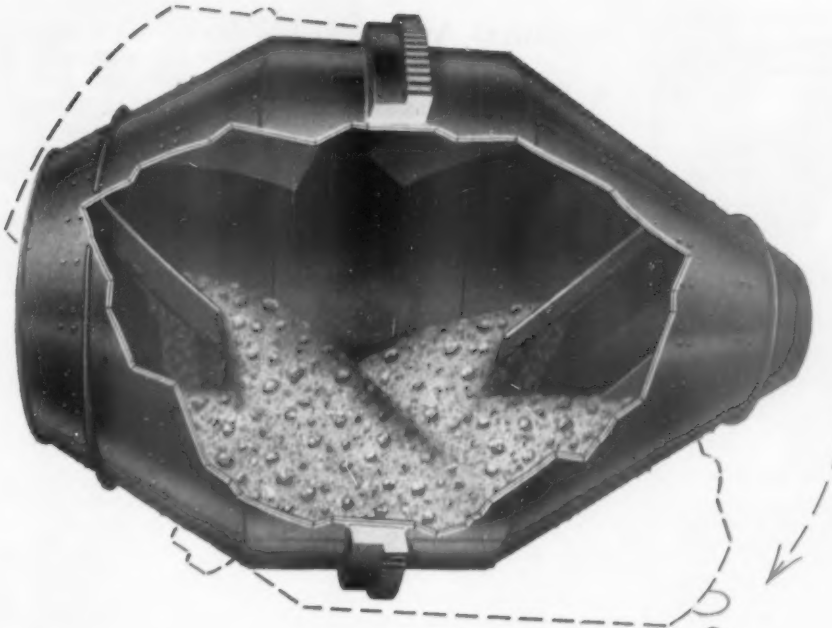

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You're looking at the inside story of a Smith Tilting Mixer. *The balance* between profits and costs *tilts way up in your favor* with these world-accepted mixers because no lifting of materials is necessary. *The batch is discharged simply by tilting the drum.*

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Regional Associations Meet In Chicago

AT THE ANNUAL MEETING of the State and Area Associations, Harold G. Feraud (Southern California) served as the presiding officer.

R. E. Hutchins, secretary, Mid-West Ready Mixed Concrete Association, told about "Short Courses in Ready Mixed Concrete Under the Auspices of State and Area Associations." Subjects covered in these courses included: driver training, fleet maintenance, defensive driving, etc. The speaker said that drivers who had taken the course saved one to two cents per mile for their employers as compared to drivers who had not taken the course. Other topics were water cement ratios and their meaning, gradation of the inert ingredients, methods of dispatching, use of admixtures, etc.

Paul R. Smith, executive secretary, Empire State Sand and Gravel and Ready Mixed Association, spoke on "Cooperation with Allied Industries in Legislative Matters."

His theme was built around the cooperative efforts of allied industries, and their favorable effect on legislative matters. In many instances, the sand and gravel, ready-mixed concrete, crushed stone, black top producers and contractors have parallel and almost identical interest in bills presented to the legislature. Some of these bills involved state and local tax laws, compensation and industrial insurance, public utility rates, labor regulations, safety, zoning, health, welfare, building codes and vehicle load limits.

Harold Feraud of the Southern California association interposed a few remarks saying that his association included a small area; roughly 65 by 45 miles, and included Los Angeles; that his group employed 2700 employes with an annual employe payroll of $15,000,000 or an average of $5555 per employe. That the invested capital was in the $45,000,000 range or $16,666 per employe.

"Service to Members" was the subject of a talk by Claude L. Clark, secretary of the Ohio Sand and Gravel Association and the Ohio Ready Mixed Concrete Association. These associations are 21 and 18 years old, respectively, with a long backlog of experience. The speaker said that both associations had an advertising service for used equipment wanted, or for sale, by its members. Information relating to industrial insurance, tax interpretations as well as a list of bond issues that are to be voted on throughout the state is supplied members. The project list tabulated school, sewage, water works, hospitals, air ports, roads and streets. A bulletin service is also maintained giving the members advance notice relating to highway department purchases.

E. R. Booker, executive secretary, for the Rock, Sand and Gravel Producers Association of Northern California, and Northern California Ready Mixed Concrete and Materials Association gave a paper on "Collective Bargaining with Labor Unions on Area Association Basis."

Mr. Booker preferred that the association work through a negotiating committee, and he outlined the general requirements of the personnel of such a group. He preferred young, vigorous men as negotiators as against salesmen or high bracket company executives. During the negotiation sessions, Mr. Booker outlined what the regional secretary's functions should be, stressing his need of a good knowledge of contracts and contract language.

The closing speaker for the session was H. J. Stockard, Jr., executive secretary of the North Carolina Ready Mixed Concrete Association, who spoke briefly on "Activities of State and Area Associations Producing Financial savings for Members."

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for — TOP QUALITY CONCRETE — always
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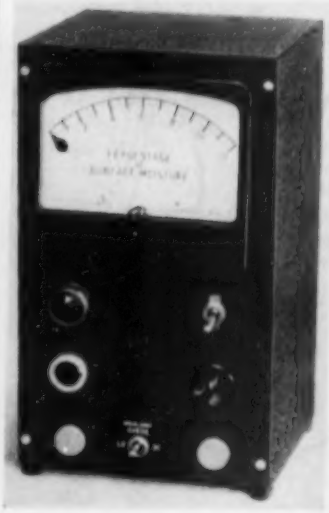

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The C & W Electronic Moisture Meter is a newly-developed precision instrument, scientifically designed, and built for years of service. It operates on the principle of conductivity of water to indicate the exact surface moisture content of material in a hopper. Changes are automatically shown.

WHAT DOES IT DO?
It does away with trial-and-error methods, cutting wet load rejects and losses. It permits the production of uniform batches of consistent slump concrete. By instantly registering exact moisture content in the weigh hopper, the meter permits complete control of batching regardless of changes in the wetness of the sand and aggregates.

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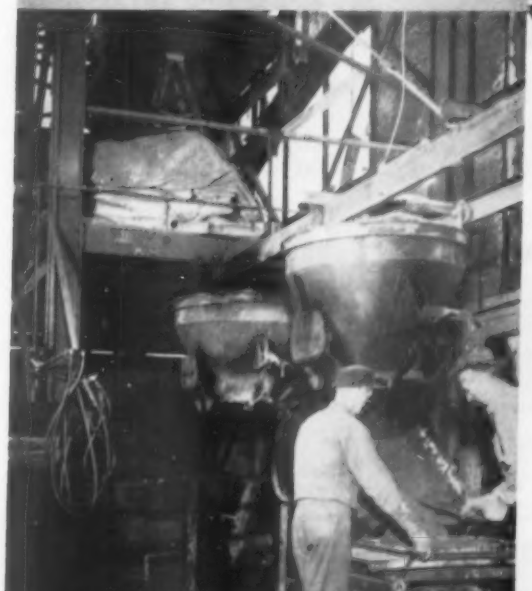
NATIONAL READY MIXED NRMCA CONCRETE ASSOCIATION

HELTZEL

PLANT HELPS CONCRETE PRODUCTS MAKER LAND LARGEST ORDER

"Heltzel Plant will save its cost in cement economies alone" says plant manager.



Further mechanizing their plant, the Columbus people designed an inexpensive method for moving concrete from the mixer to the forms. Half-yard Heltzel Concrete Buckets were fitted with wheels which ride in an overhead rail that leads to the various departments. The concrete is discharged into hoppers, then as required, into the forms.

Concrete products manufacturers who feel they can't afford modern day batching equipment should talk with the people at the Columbus Cement Products Co., Columbus, Ohio.

For the past five years, this concern was making a variety of products without the advantages of a batching facility. An aggresive management realized that if they were to expand, they would have to have the help of an up-to-date batching plant. **After looking over many types, they selected a Heltzel Combination Plant with Heltzel Cement and Aggregate Elevators.**

The result: the same crew has almost doubled its productivity; they have expanded their line of products; they find they can accept larger orders, and by reason of this improvement have been selected to supply the products required on Central Ohio's largest building project; they save several thousands of dollars by buying cement in bulk instead of by bag.

Says Ed Haban, Plant Manager at Columbus, "We certainly made the right move when we selected the Heltzel Batching Plant. We are recovering our cost in cement economies alone. Further, we find that maintenance costs are at a minimum."

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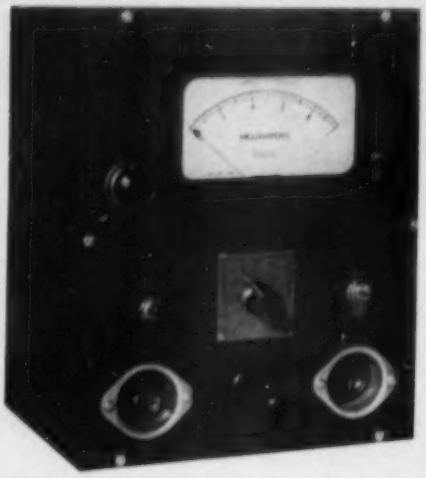

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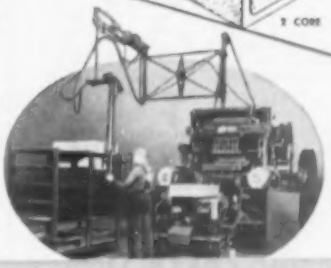

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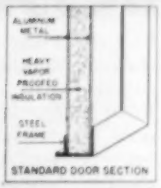

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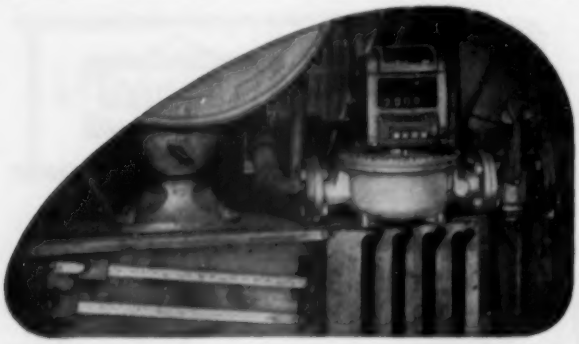

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Equipment less than 2 years old and in perfect condition. Reason for selling, installing larger equipment, also have Model No. 9 Joltcrete for sale.

IONIA CONCRETE PRODUCTS, INC.

310 Cleveland St. Ionia, Michigan

FOR SALE

1—Lith-I-Bar Block Machine #2105, 2—block Automatic Pallet Return
4", 6", 8", 10", & 12" Molds
Chimney & Pier Block Molds
1—Lot of Repair parts
1—18 cu. ft. Stearns Skip
1—30 cu. ft. Kelly Mixer with 30 H.P. Motor
47—60 block racks
1400—18" x 18" x ¼" Pallets
1—42' Stearns Mixer with Motor
1—42' Stearns Skip
1—Lot Repair Parts.

All above in perfect working condition, subject to prior sale.

SUPER CONCRETE CO., INC.

405-11 Henderson Ave. Sumberland, Md.

GOOD WILL BUILDERS

Your contractor and bricklayer customers will be able to do quicker, easier, straighter work with UB Tools . . . tools that carry YOUR OWN COMPANY ADVERTISING. Linestretchers, Corner Ties, Line Pins, Twigs, Concrete Calculators. We also wholesale a complete line of Blocklayers' Tools. Write for literature and prices.

UNITED BUILDERS
1822 Lindberg Dr., Muskegon, Mich.

One Fleming L-180 Block machine with two molds and attachments.

One 8x8x16" regular mold with attachments to make 8x8x16 pilaster, 8x8x16 sash, 8x8x16 bull nose sash, 8x8x8 regular, 8x8x8 sash and 8x8x8 bull nose sash.

One 4x8x16" regular mold with attachments to make 4x8x16 solids.

Wooden racks and pallets for 1,000 blocks.

One 12 cubic foot Sterns batch mixer with 7½ H.P. motor.

Priced very reasonably with terms if desired

OLATHE BLOCK COMPANY

Route 2 Olathe, Kansas

PRESSED STEEL PALLETS
4" — 8" — 12"

For sale or trade for Fork Lift Truck, Hand Lift Truck or used Air Compressor.

Otoe Concrete Products Co.
Nebraska City, Nebr.

CONCRETE BRICK COLORS
CEMENT COLORS
MORTAR COLORS
made by
BLUE RIDGE TALC CO., INC.
Henry, Virginia

FRANCHISE AVAILABLE

Introducing the DAVIDSON LIFETIME CONCRETE GARBAGE DISPOSAL unit. This revolutionary money maker sells on sight, and when it's in, all the neighbors want one. Completely eliminates garbage men, cans, odors, flies, animal nuisance, etc. Write immediately for details and exclusive franchise.

DAVIDSON WILTON, N.H.

FOR SALE

F.M.C. 180 Block Plant Equipment complete with 18 cubic foot mixer, bucket elevator, belt conveyors, bin, racks and pallets.

Price.....$6,500.00

COLBECK'S CONCRETE CO.
Lebanon, Missouri

One Fleming 180 machine
One 8"mold (one at a time)
One 4" mold (two at a time)
1200 8" pallets, wood
700 12" pallets, wood

BEATTYVILLE BLOCK CO.
Beattyville, Kentucky

Complete Brikcrete Factory (no real estate) in Rushville, Indiana. Reason for selling, owner is a M.D. and doesn't have time to supervise it. Contact:

TOM MATTOX
123 E. 1st St. Rushville, Ind.

ALSO SEE WHERE TO BUY ADVERTISING ON OTHER EQUIPMENT IN ROCK PRODUCTS' GENERAL SECTION

FOR SALE

Complete Block plant now in operation, and own gravel and sand pits, in Wisc. Reason for selling, other interests. Write to:

BOX O-24, CONCRETE PRODUCTS
79 W. Monroe St. Chicago 3, Ill.

FOR SALE
OR
WILL ENTER JOINT VENTURE

A complete Besser Super Vibrapac plant including machine, skip hoist, 56 C.F. mixer, pallets, racks, two fork lifts (6,000#), Barber Green car unloader & portable conveyor, Columbia Splitter and many other items—All in perfect condition.

CRESCENT CONCRETE PRODUCTS CORP.
2033 Dauphine St. New Orleans 17, La.

FOR SALE

Going Ready Mix plant 5 units—Good supply of cement. Plenty building, town 15,000, Northeastern Oklahoma. Selling at a Sacrifice Price because of other business.

BOX O-30, CONCRETE PRODUCTS
79 W. Monroe St. Chicago 3, Ill.

WANTED

Dunbrick or Cavitex Machine. Please give full data as to age, condition and lowest cash price.

GROSS-AIRE MFG. CO.
9416 West Milton Overland 14, Mo.
HArrison 9-1163 or HArrison 7-2442

SITUATION WANTED

Stearns Service Engineer, three and one half years experience, desires position in block plant. Willing to work, small amount of capital available. College education, married, veteran, 28 years old. If interested contact:

FOREST L. HAYS
214 Plane St., Whitney 4-3850, Middletown, Pa.

LOWER COST
packer-head wings

Proved to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
LUFKIN, TEXAS

Small Block Plant Owner

I have quite a supply of used machines that are replaced by larger plants who need larger production. Some of these setups are in very good condition. As they are a surplus to me, I will sell on any reasonable terms with payments as low as $50.00 a month.

Mid-Western Concrete Equipment Co.
Box 646 Mukwonago, Wis.

COLORS *For Cement and Concrete*

COLOR YOUR CONCRETE WITH LANSCO CEMENT COLORS, available in 40 ATTRACTIVE shades. Suitable for all types of concrete products. Write for our new color card, copy of "Suggestions For Using Cement Colors", and for free samples and price list.

Manufactured by:

Landers-Segal Color Co.
72 Delavan Pl. • Brooklyn 31, N. Y.

Pallets
Racks
Lift Trucks
Block
Machinery

WITTEMANN MACHINERY COMPANY
FARMINGDALE, NEW JERSEY
Specialists in Concrete Products Equipment
Eastern Representatives of the
COLUMBIA MACHINE WORKS, Vancouver, Washington

Elevators
Bins
Conveyors
Feeders
Mixers

FOR SALE

Fork and platform power lift trucks, used and guaranteed factory rebuilts.

ERICKSON POWER LIFT TRUCKS, INC.
Saint Anthony Blvd. & University Ave. N.E.
MINNEAPOLIS 18, MINNESOTA
Phone—Sterling 1-9508

FOR SALE
#9 JOLT CRETE—3 AT A TIME

4000 8" Equiv. A DAY Excellent condition. 8" & 12" attachments with approx. 4800 8" & 2700 12" pallets. Approx. 100 Chase block cars, transfer cars, rail and turntable. Many spare parts for machine included. ALSO a complete drag line with 75 H.P. motor.

NASSAU CONCRETE PRODUCTS CO., INC.
P. O. Box 6 No. Baldwin, L.I., N.Y.

unbreakable
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

FOR SALE

Ready-Mix Concrete Plants, have two to offer, Missouri towns, one 25,000, other 10,000. Modern throughout. Doing excellent business. Owner retiring.

J. L. McHUGH CO., INC.
Long Bldg. Kansas City, Mo.

FREE SERVICE for Buyers

Get information and prices quickly on machinery, equipment. Check item (or items) about which you desire information. Send to us.

*Specify type.

Send to: Research Service Department

ROCK PRODUCTS
79 West Monroe St. Chicago 3, Ill.

- Admixtures, Aggregate
- Aftercoolers, Air
- Agitators*
- Aggregates (special)*
- Air Compressors
- Air Separators
- Asphalt Mixing Plants
- Bagging Machines
- Bags*
- Barges
- Batchers
- Belting, Conveyor, Elevator, Power Transmission*
- Belt Repair Equipment
- Bin Level Indicators
- Bins and Batching Equipment
- Bits*
- Blasting Supplies
- Block Machines,* Concrete Building
- Bodies, Trailer*
- Brick Machines and Molds
- Buckets*
- Bulk Cement Handling Equipment
- Bulldozers
- Cars, Industrial
- Central Mixing Plants
- Classifiers
- Clutches
- Coal Pulverizing Equipment
- Concentrating Tables
- Concrete Forms
- Concrete Mixers*
- Concrete Mixing Plants
- Concrete Specialty Molds
- Concrete Waterproofing and Dampproofing
- Conveyors*
- Crushers*
- Coolers
- Cranes*
- Curing Equipment
- Derricks
- Dewatering Equipment, Sand
- Diesel Engines
- Dragline Cableway Excavators
- Draglines
- Dredge Pumps
- Drilling Accessories
- Drills*
- Dryers
- Dump Bodies*
- Dust Collecting Equipment & Supplies
- Electric Motors
- Engineering Service, Consulting and Designing
- Explosives & Dynamite
- Fans and Blowers
- Feeders*
- Fifth Wheel, Heavy Duty Special
- Flotation Equipment
- Front End Loaders*
- Gasoline Engines
- Gear Reducers
- Generator Sets
- Grinding Media*
- Gypsum Plant Machinery
- Hard Surfacing Materials
- Hoists
- Hoppers
- Kilns: Rotary, Shaft, Vertical
- Locomotives*
- Lubricants*
- Magnetic Separators
- Masonry Saws
- Mills*
- Pipe*
- Pumps*
- Scales*
- Screen Cloth*
- Screens*
- Scrubbers: Crushed Stone, Gravel
- Shovels, Power*
- Speed Reducers
- Tanks, Storage
- Tires and Tubes
- Torque Converters
- Tractor Shovels*
- Tractors*
- Trailer Dump Bodies
- Trucks, Bulk Cement
- Trucks, Industrial
- Trucks, Mixer Body
- Trucks, Motor
- Valves
- Vibrators
- Welding and Cutting Equipment
- Winches
- Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

Your Name _____ Title _____

Firm Name _____

Street _____

City _____ State _____

CF-4

Costs down, Profits up with Automatic Hydraulic Chute Operation

MONARCH DYNA-CHUTE

Write for Cost-Saving Data

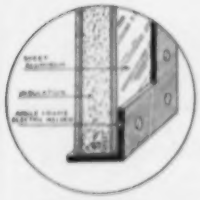
Manufacturers of Hydraulic Controls

MONARCH ROAD MACHINERY COMPANY

1331 Michigan St., N.E. — Grand Rapids 3, Mich.

Moore Carrier-Type Doors at Glynn Concrete Co., Brunswick, Ga.

Moore Metal-Insulated Kiln Doors Save Fuel—Reduce Curing Time



Keep heat where it belongs—inside the kiln—with Moore Aluminum-Insulated Doors. They improve curing conditions — save steam—last longer.

Send us dimensions of present door openings for quotation.

MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Lumber and Veneer Dryers

JACKSONVILLE, FLORIDA · BRAMPTON, ONT. CANADA · VANCOUVER 5, B. C. CANADA · NORTH PORTLAND, OREGON

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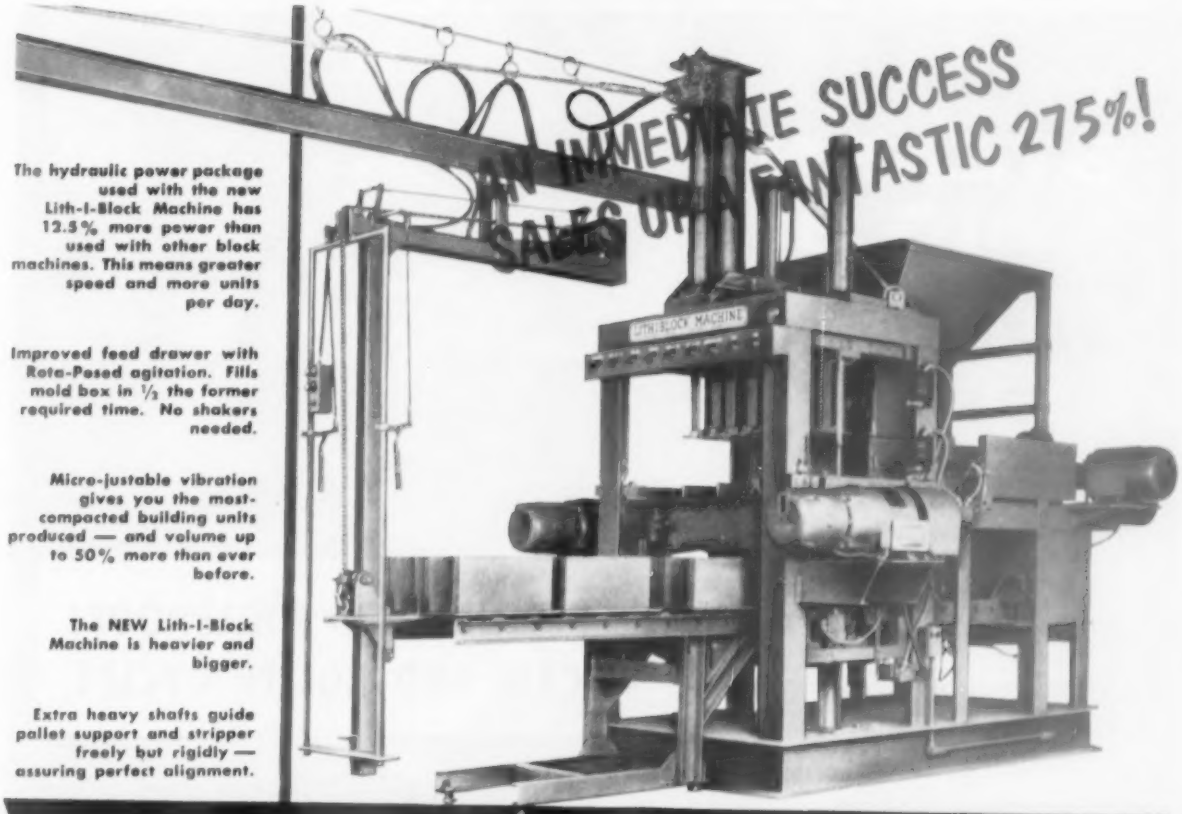


The hydraulic power package used with the new Lith-I-Block Machine has 12.5% more power than used with other block machines. This means greater speed and more units per day.

Improved feed drawer with Rota-Posed agitation. Fills mold box in ⅓ the former required time. No shakers needed.

Micro-justable vibration gives you the most-compacted building units produced — and volume up to 50% more than ever before.

The NEW Lith-I-Block Machine is heavier and bigger.

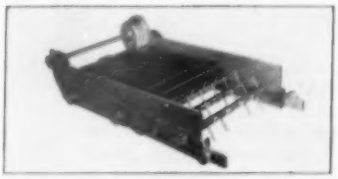
Extra heavy shafts guide pallet support and stripper freely but rigidly — assuring perfect alignment.

GO MODERN — GO LITH-I-BLOCK

Redesigned Lith-I-Block Machines have increased output — up to 1000 blocks per hour.

LITH-I-BLOCK "Greater Production Machines"

NOW...HYDRAULICALLY or AIR POWERED



ROTA-POSED® AGITATION — provided by three heavy-duty rotating shafts with interlocking fingers

MICRO-JUSTABLE® VIBRATION — vibrator weights are adjustable to any vibration intensity desired.

BONUS QUALITY
LITH-I-BLOCK
MADE ONLY ON THE LITH-I-BLOCK MACHINE

THE BLOCK MACHINE WITH THE **PROVEN FEATURES** *MOST WANTED BY BLOCK PRODUCERS*

SALES AND SERVICE THE WORLD OVER

LITH-I-BAR COMPANY

HOLLAND · MICHIGAN

ONE PIECE OF EQUIPMENT OR A COMPLETE PLANT LAYOUT

LITH-I-BAR CO. HOLLAND, MICH.

Send me latest bulletins on Lith-I-Block Machine.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY & STATE _____

SEE THE

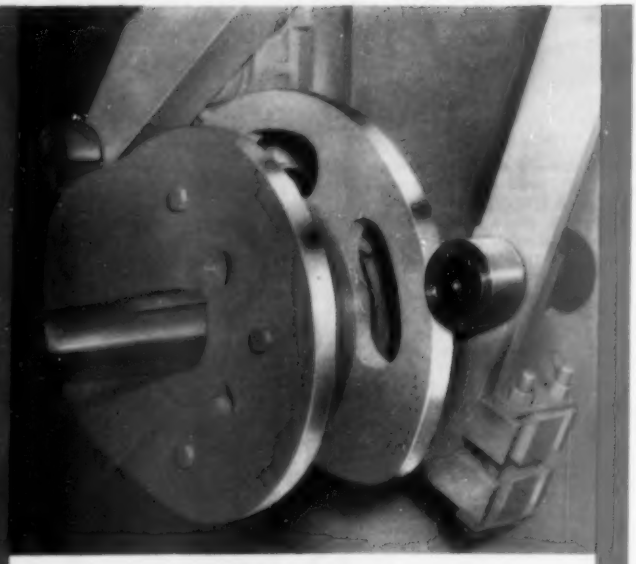
STEARNS BIG 3*

(SERIES 50 BLOCK MACHINES)

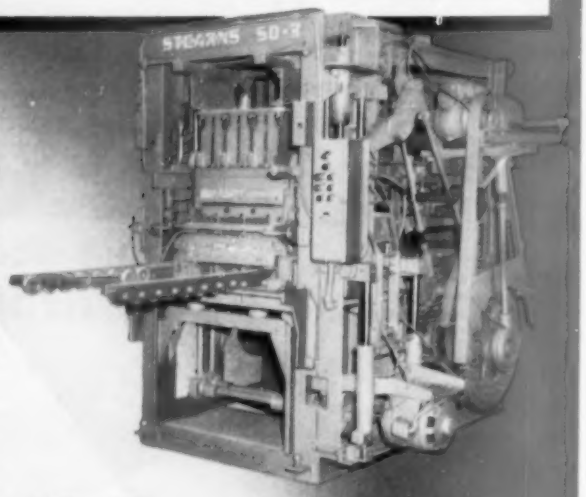
BEFORE YOU DECIDE!

...they're out-performing the field!

MAKE YOUR OWN COMPARISON . . .



DEPENDABLE! FOOLPROOF! CAM AND ROLLER CYCLE!



We invite your comparison to any machine in the Series 50 price class. Compare the positive cam and roller cycle, combined with the smoothest pallet feed and block ejection principle yet conceived. Watch the complete cycle of smooth, continuous operation . . . without the use of temperamental pistons, valves or liquid. Your assurance of uninterrupted production. Compare item for item and pound for pound, and UPPERMOST, compare the QUALITY of the blocks produced . . . your best protection on your investment.

PRICE vs QUALITY Sometimes a bargain is measured by how little you pay . . . sometimes by how much you get. Any one of the Stearns Big 3* Block Machines is a Bigger Bargain by both measures. ASK ANY OWNER! or, let's check the records! Of *all* the Stearns Series 50 block machines manufactured and installed since 1949, only *one* machine is temporarily inactive. Definite proof of their superiority.

We are proud of this enviable record, made possible by customers old and new . . . block manufacturers who know that QUALITY is always a bargain.

Yes, when you compare PRICE *and* QUALITY . . . you will agree, "You get more when you get a Stearns". . .

* THE BIG 3

Model 50-3 makes three 8" x 8" x 16" or equivalent units per cycle. Maximum size pallet, 5/16" x 18½" x 26".

Model 50-2 makes two 10" x 8" x 16" or equivalent units per cycle. Maximum size pallet, 5/16" x 18½" x 20½".

Model 50-1 makes two 8" x 8" x 16" or equivalent units per cycle. Maximum size pallet, 5/16" x 18½" x 18½".

ALL MODELS EASILY CONVERTED TO MAKE UNITS FROM 4 INCHES TO 12 INCHES IN HEIGHT

ASK ANY OWNER!

STEARNS

MANUFACTURING COMPANY, INC.

ADRIAN • MICHIGAN

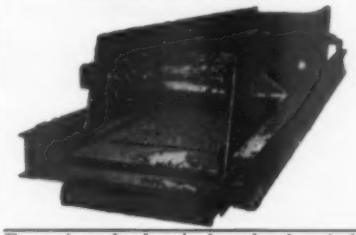
COMPLETE CONCRETE PRODUCTS PLANT EQUIPMENT

"THE STANDARD OF PERFORMANCE"

BONDED EQUIPMENT BARGAINS

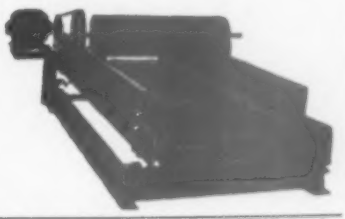
IMMEDIATE SHIPMENT FROM OUR FACTORY — WRITE, WIRE OR PHONE

NEW BONDED® HEAVY DUTY VIBRATING SCREENS



Model Number	Screening Area	No. of Decks	Sale Price
124AS	2′ x 4′	1	$ 355
224AS	2′ x 4′	2	375
126AS	2′ x 6′	1	375
226AS	2′ x 6′	2	395
136AS	3′ x 6′	1	495
236AS	3′ x 6′	2	585
336AS	3′ x 6′	3	815
138AS	3′ x 8′	1	575
238AS	3′ x 8′	2	695
338AS	3′ x 8′	3	845
138BS	3′ x 8′	1	1119
238BS	3′ x 8′	2	1165
338BS	3′ x 8′	3	1250
248BS	4′ x 8′	2	1495
348BS	4′ x 8′	3	1850
2410BS	4′ x 10′	2	1775
3410BS	4′ x 10′	3	2095
3412BS	4′ x 12′	3	2295

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry. HEAVY DUTY MODELS, TYPE BS: 4-bearing positive throw, eccentric shaft; 3′ x 8′ to 5′ x 14′, 1 to 5 decks. GENERAL DUTY SCREENS, TYPE AS: eccentric weight mechanism, spring mounted, 1 to 3 decks, 2′ x 4′ to 3′ x 8′. Write for new 8-page Bulletins 1086 and 1087.

BONDED CARRIES LARGE STOCKS OF SCREEN CLOTH FOR IMMEDIATE SHIPMENT

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5″ roll diam. idlers and return rolls 20″ diam. head pulley and 16″ diam. tail pulley mounted on 2¼″ or 2-7/16″ diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛″ top rubber cover x 1/32″ bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

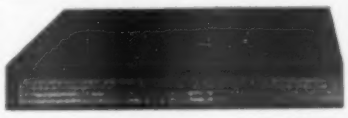
Belt Width	Length of Conveyor	List Price	Sale Price
14″	25′	$1166	$ 672
14″	50′	2016	1064
14″	85′	3206	1612
16″	20′	1083	692
16″	45′	1928	1012
16″	60′	2494	1264
18″	25′	1327	739
18″	45′	1986	1085
18″	85′	3466	1798
18″	100′	4001	2065
20″	25′	1366	770
20″	60′	2762	1426
20″	90′	3950	1995
24″	25′	1428	835
24″	45′	2227	1237
24″	70′	3226	1744
24″	100′	4425	2339
30″	50′	2669	1504
30″	70′	3576	1971
30″	90′	4483	2432
36″	25′	1632	1040
36″	45′	2492	1561
36″	60′	3327	1950
36″	100′	5102	2990

For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting.

For 14″ belt.....$15.66 per foot
For 16″ belt..... 16.78 per foot
For 18″ belt..... 17.90 per foot
For 20″ belt..... 18.95 per foot
For 24″ belt..... 20.66 per foot
For 30″ belt..... 23.02 per foot
For 36″ belt..... 26.00 per foot

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck, ⅛″ top rubber cover x 1/32″ bottom cover, 12# to 15# average friction pull, 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	List Price	Sale Price
14″	$3.43 foot	$2.75 foot
16″	3.56 foot	2.88 foot
18″	4.27 foot	3.19 foot
20″	4.69 foot	3.69 foot
24″	5.55 foot	4.14 foot
30″	6.77 foot	5.06 foot
36″	8.01 foot	6.00 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛″ top rubber cover x 1/32″ bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. For more severe service, high tonnages and abrasion resistant. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has a molded rubber edge.

Width	Ply	List Price	Sale Price
18″	4	$5.09 foot	$3.72 foot
20″	4	5.57 foot	4.03 foot
24″	4	6.56 foot	4.80 foot
30″	4	8.05 foot	5.89 foot
24″	5	7.68 foot	5.61 foot

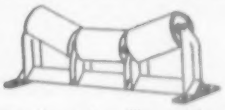
Additional widths and plies available at low prices. Write for Free Sample.

NEW BONDED GEAR REDUCERS

H.P. At 20:1 Ratio	H.P. At 30:1 Ratio	Price
3	2	$ 81
5	3	142
10	7½	228
15	10	286
20	15	394
25	20	468
30	25	575
40	30	750
60	50	925

Reducers are right angle with worm on bottom (underdriven) and all models are fan cooled by means of a radial fan. Reducer will operate in either direction. Other sizes and ratios available at bargain prices.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5″ diameter Troughing Idlers for:

14″ belt	$17.25	24″ belt	$19.75
16″ belt	18.00	30″ belt	20.50
18″ belt	19.00	36″ belt	21.25
20″ belt	19.25	48″ belt	23.75

1-roll, 5″ diameter Return Idlers for:

14″ belt	$6.75	24″ belt	$ 8.00
16″ belt	7.00	30″ belt	8.75
18″ belt	7.50	36″ belt	9.25
20″ belt	7.75	48″ belt	10.75

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Manitowoc 3500, 3½ yds. High Lift Shovel.
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Lima 604 Backhoe-Crane-Drag. Cat. D13000 Diesel.
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JAW: Acme 10x20, 14x26, 14x28, 10x42, 16x32, 18x32, 25x40, Eagle 20x36. Diamond 24x36", Cedar Rapids 10x30, 30x36, 25x40. Farrell 10x20, 18x30, 14x36, 18x36, 26x48. Buchanan 36x42. Good Roads Reliance 15x30. Traylor 16x36, 24x36. Allis-Chalmers 30x18. Good Roads 10x30, Telsmith 18x32. Traylor 48x60, 42x48. Allis-Chalmers 42x60.
GYRATORY: Al-Chal 322, 6", 7½", 8, 9, 9½, 10, 20, 30 and 50" Telsmith 8B, 28" Intercone, 36" Gyrasphere; Kennedy Van Saun 7, 19, 25½-8.37½, 34; Traylor TY 10", 36", 4' Type TG.
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HAMMERMILL: Jeffrey Type B3 24x20, Type B 36x24, 36x36, 36x42, Eagle 24x24, Stedman 24x30, Cedar Rapids 50-50, 30x32.
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RP-4-56

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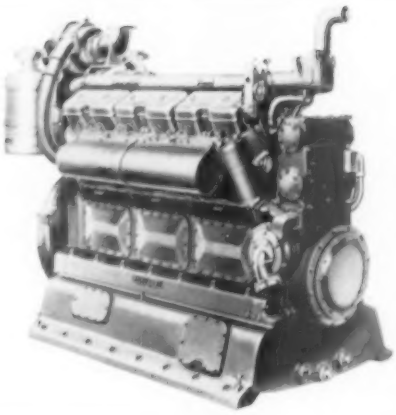

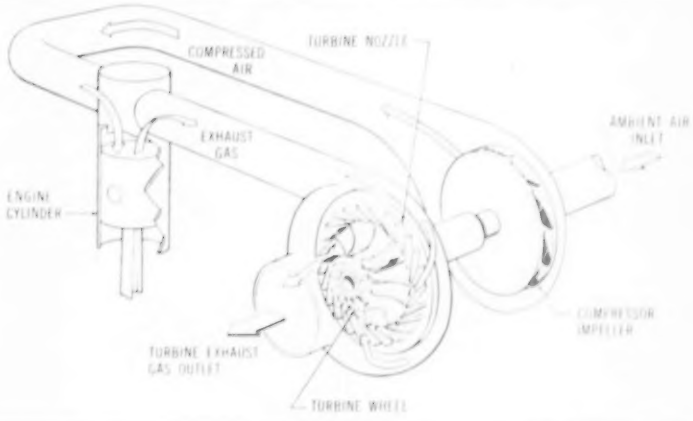

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